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The Mining Journal

LONDON, FEBRUARY 19, 1960

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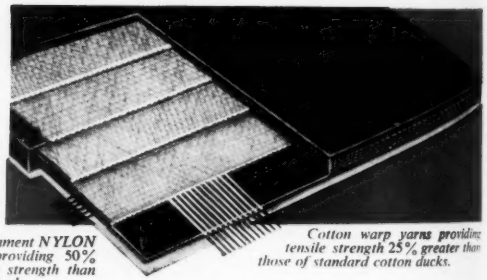

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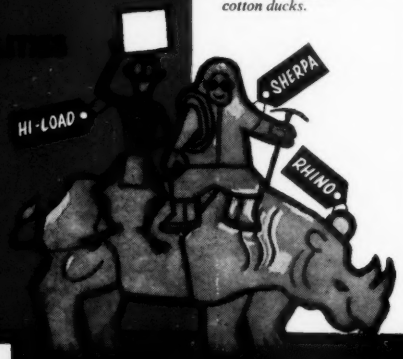

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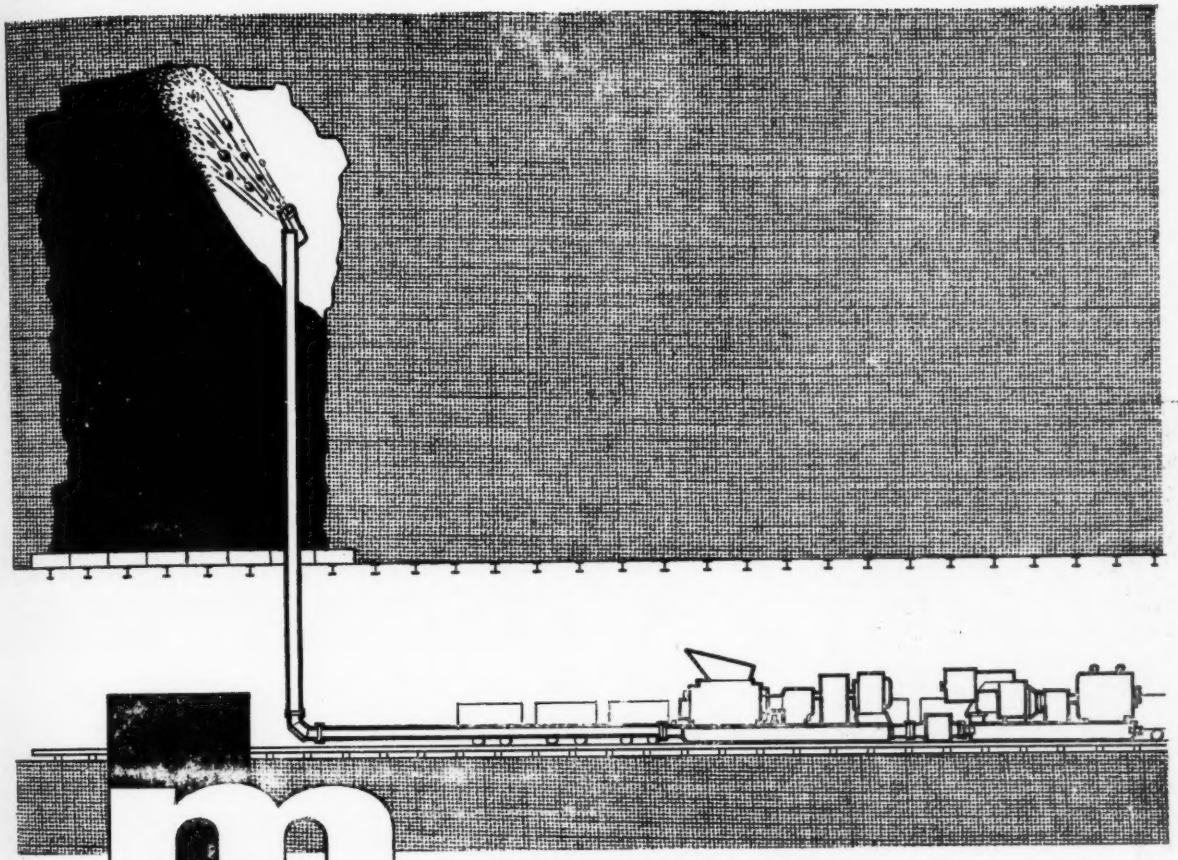

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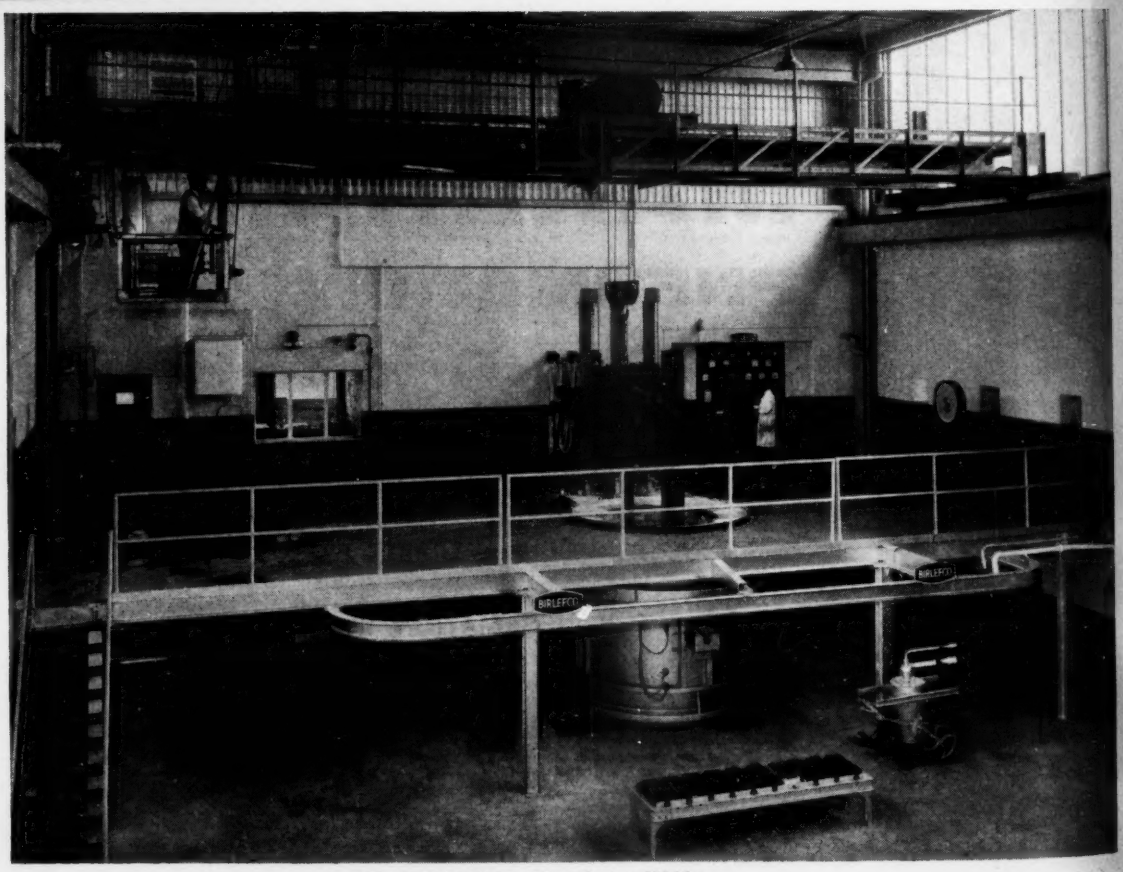

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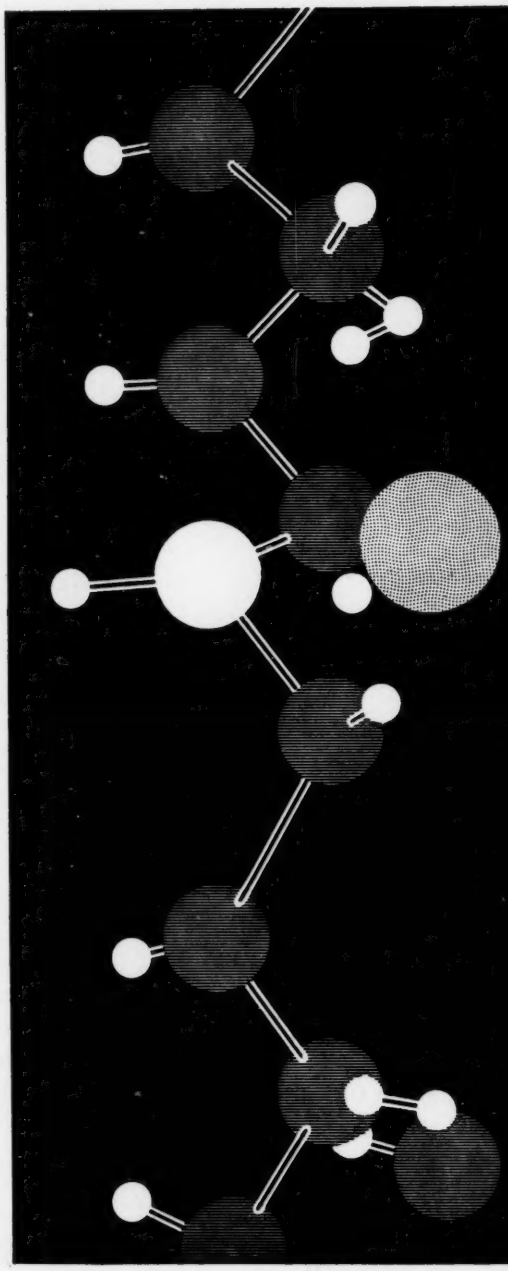

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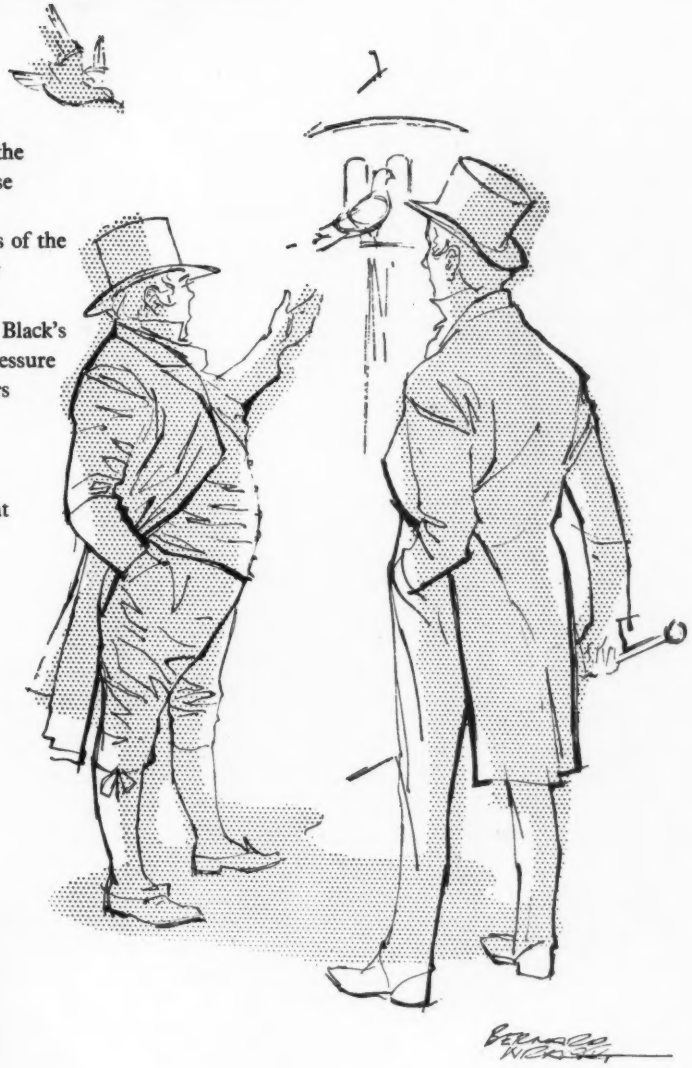

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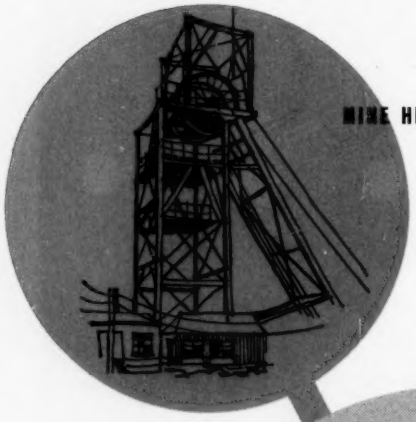

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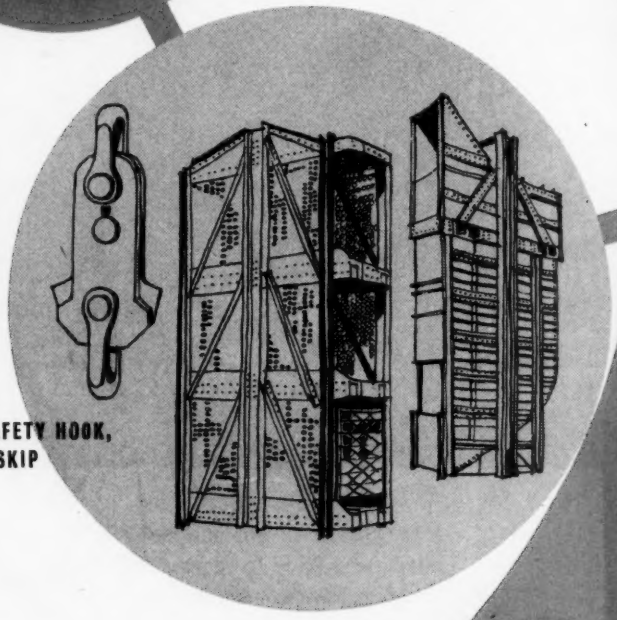

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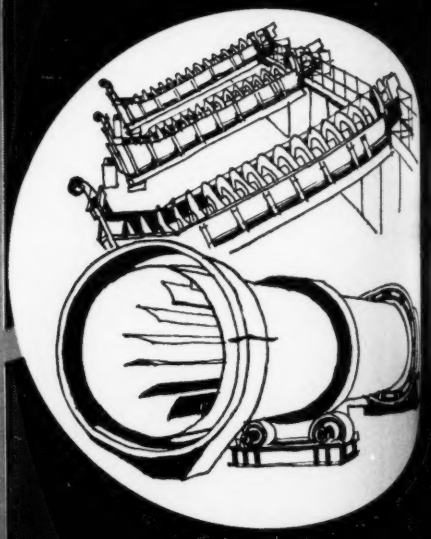

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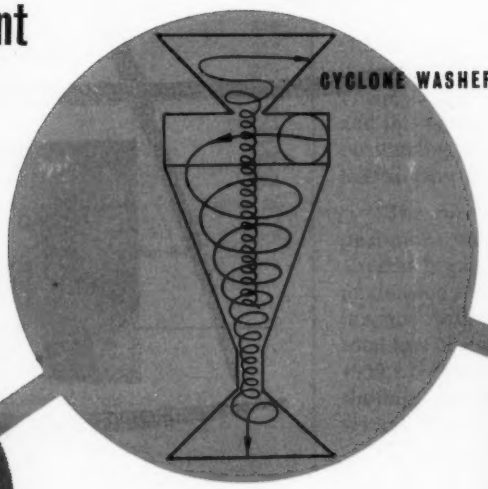

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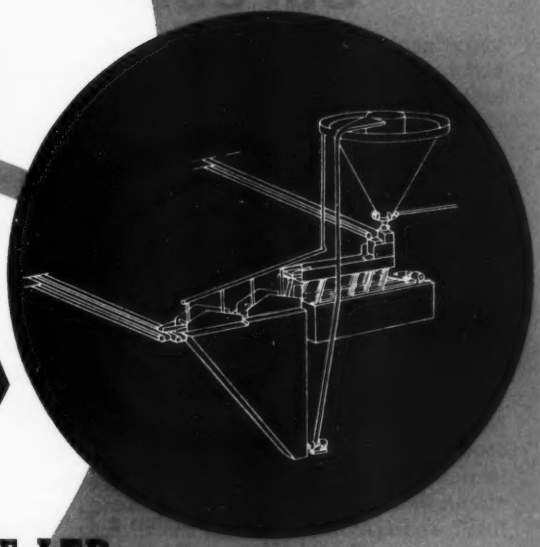

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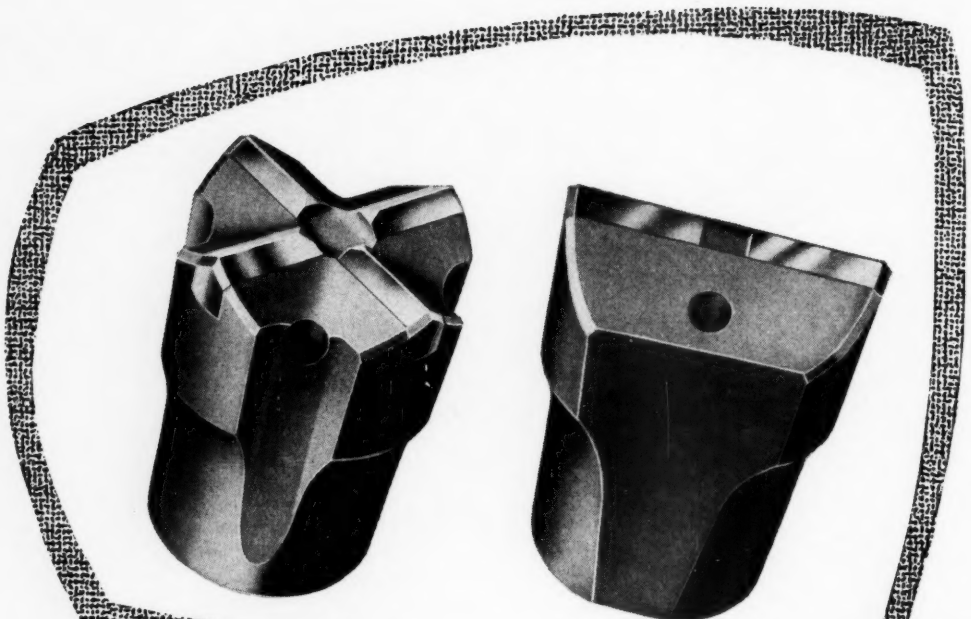

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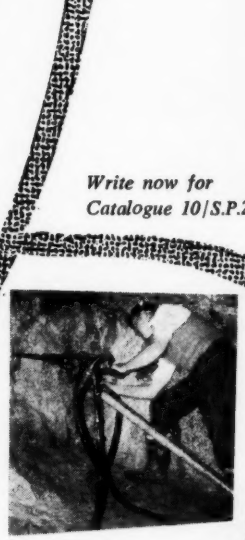

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The Mining Journal

London, February 19, 1960

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Copper After the Strikes

THE strikes in the United States copper industry, which broke out in August last year, have gradually been ending as one deadlock after another was at last resolved. So far as the disputes within the industry itself are concerned, this particular chapter in American copper history can be regarded as nearing its end. The only strikes now outstanding are those at Phelps Dodge's Laurel Hill refinery, and the White Pines mine in Michigan.

The most intractable issue was not that of wages and benefits, but the controversial " no strike " clause under which, in previous contracts, the Mine, Mill and Smelter Workers' Union was liable for damages if a strike took place during the currency of the agreement. On this issue the union finally accepted defeat when it agreed to the inclusion of the no-strike principle in the new contract ratified with Phelps Dodge for the company's Arizona copper mines and smelters, and this settlement paved the way for the conclusion of the disputes outstanding with the same company and with Anaconda. Operations had already been resumed at all Kennecott's plants.

The effects of the copper strikes became manifest long before operations were suspended, for by the end of 1958 consumers had already begun building up stocks against the time of need, thus minimising the consequences of the stoppages which, in conjunction with the short-lived stoppage at El Teniente, entailed a total loss of some 334,000 l. tons of copper in the last five months of 1959. Now, of course, the strikes have left their legacy in a severe shortage of refined copper which is unlikely to be fully overcome for several months.

Nevertheless, as was recently pointed out by the British Metals Corporation last week, world output throughout 1959 was not brought below the level of consumption despite the prolonged strikes. In fact, producers' stocks actually rose, on balance, by 80,000 tons, this being approximately offset by the total fall in stocks held by consumers and others. On present indications, therefore, it would appear to be only a matter of a few months before copper is once more freely available, despite the fact that the restoration of normal production in the United States is being hampered by factors outside the industry's control, such as the breakdown at Asarco's Perth Amboy refinery and Phelps Dodge's dispute with the railwaymen, which is affecting production at the company's leading Arizona mine. On the other hand, the possibility that the supply position in the immediate post-strike period might be eased by releases from the D.P.A. stockpile cannot be overlooked.

Looking ahead to the second half of 1960, the British Metal Corporation emphasises that the prospect is decisively coloured by the still increasing world capacity to produce copper, notwithstanding that there is good reason to expect consumption to expand appreciably further. A world total consumption in 1960 of 3,800,000 tons is regarded as a fair guess. Against this, however, the production potential for 1960, including, for the first time, the big new

Toquepala mine in Peru is about 4,100,000 tons and the emerging surplus may be expected to bear more and more heavily on the market. In fact, it may well be that before the year is out voluntary curtailments of output will again be under consideration by some producers.

All this assumes the absence of major strikes, but the fact that in Chile the Salvador labour contract expires on April 30 and Chuquicamata's agreement on September 30 suggests that the prospect of a year without any serious labour disputes can by no means be taken for granted. Workers at El Salvador were reported to be demanding a pay increase of about 36 per cent in the new contract.

Mr. J. R. Simpson, assistant treasurer of Kennecott, told the Pittsburgh Society of Financial Analysts that 1960 should be a good year for copper producers. He also stated, however, that a situation of excess supply might continue for a matter of years in view of the various new properties in the process of development which will be offering copper in world markets.

THE WORLD'S FUEL RESOURCES

At the present time, the amount spent on fuel and power by industrial and domestic consumers in the United Kingdom is in the region of £2,000 million a year (excluding about £350,000,000 in taxes on hydro-carbon oils), or more than 10 per cent of the national income. These impressive figures were given by Dr. Albert Parker, lately director of Fuel Research, D.S.I.R., in the first of three lectures on " The Fuel and Power Industries and National Prosperity," given to the Royal Society of Arts on February 15.

Pointing out that national productivity and prosperity are dependent on the availability of fuel and power to assist or replace manual labour, Dr. Parker surveyed world energy resources and estimated the probable changes in demand in Britain and other countries. According to the available information, the probable world reserves of bituminous coals and anthracites are about 4 million million tons and of brown coals and lignites about 1 million million tons. This gives a total for all coals and lignites of 5 million million tons, equivalent in value to about 4½ million million tons of bituminous coal, of which 1 million million tons have been proved. These reserves are badly distributed, however, one-third of the estimated world total being in the U.S.A., one-quarter in the U.S.S.R., and nearly one-quarter in China, leaving only about one-fifth for the rest of the world, which has nearly two-thirds of the world population of 2,900 millions.

Possible and proved reserves of petroleum were given as about 100,000 million tons, equivalent in thermal value to about 150,000 million tons of bituminous coal, with possible reserves of natural gas equivalent to a further 130,000 million tons. Probable reserves of peat were estimated as equivalent to at least 65,000 million tons of coal. Other potential energy resources mentioned included atomic energy, geothermal energy, energy from sun, wood, water and wind power.

It is clear from Dr. Parker's survey that the amount of potential and sensible energy within the earth and being received from the sun is colossal. The problem facing the world is that of harnessing the resources at reasonable cost to meet the various and rapidly growing needs of an increasing population. At present the world relies mainly for heat and power on the use of the fossil fuels, coals and lignites, petroleum and natural gas. These fuels are being used up faster than nature produces them, and they are not always conveniently distributed in the accessible crust of the earth. The questions that arise, therefore, are for how long will the economically recoverable reserves of fossil fuels meet world needs, and will economic methods of harnessing the other sources of energy be developed before the fossil fuels are exhausted or become too costly ?

If world population and energy demand continued to increase at the same average geometric rate as during the last twenty years, then by the year 2000 the population would reach about 5,000 millions and the annual energy demand would be equivalent to 17,500 million tons of coal; by the year 2100 the population would reach 18,500 millions and the energy demand would be equivalent to 435,000 million tons of coal. However, the unprecedented rate of growth of the population that has occurred since the beginning of the twentieth century can scarcely continue. Two-thirds of the population today are under-nourished and it seems unlikely that in the foreseeable future sufficient food could be produced for a population greater than about 5,000 millions.

So far as the United Kingdom itself is concerned, it has been estimated that the population will be nearly 56,000,000 in 1980 and about 58,000,000 in the year 2000. Assuming a continuation of increase in energy demand at about the same rate as during the period 1938-1958, the demand would be equivalent to about 280,000,000 tons of coal in 1970, 310,000,000 in 1980, and 370,000,000 in the year 2000. The questions which at once arise are in what proportion these prospective demands will be met by coal, petroleum oils, nuclear energy and other forms of energy, and to what extent and by what methods the coal will be converted or used to provide coke, gas, electricity and oil. Important factors will be the relative prices, the overall costs of the useful energy obtained, and the effects of the different fuels and forms of energy on industrial productivity. There is sufficient workable coal in the United Kingdom to provide 250,000,000 tons a year for 200 years.

WANTED, MARKETS FOR USED URANIUM

The Department of the Interior of the U.S. Government has disclosed that four Bureau of Mines research centres are co-operating with the Atomic Energy Commission in studies to find uses for mounting stockpiles of depleted uranium—a byproduct of the enriched uranium produced for the A.E.C.

The A.E.C. already has on hand substantial quantities of this material in the form of uranium hexafluoride (called " depleted uranium " because most of the fissionable component, U-235, has been removed). Several thousand tons of this material probably could be made available each year, if Government or industry could develop applications for it, the Department explained.

Bureau of Mines studies—partly supported with A.E.C. funds—are aimed at finding large volume uses for depleted uranium in the metallurgical and petroleum industries.

Scientists at the Rolla (Mo.) Metallurgy Research Centre are evaluating the possibility of blending depleted uranium metal with lead, tin, or copper to produce a superior combination for metal bearings. They also are conducting tests to determine whether sacrificial anodes of depleted uranium will prove more effective than conventional zinc and magnesium in retarding galvanic corrosion of pipelines and other structures that are frequently exposed to this kind of deterioration. The sacrificial anode, connected to an underground pipeline, underwater ship hull, or similar object, reverses corrosion processes. This reversal causes the anode to disintegrate instead of the object it protects.

Because uranium is one of the heaviest materials known, the Boulder City (Nev.) Metallurgy Research Laboratory is exploring the possibility of using it in processes that separate minerals according to their different densities. Uranium is more dense than the ferro-silicon and magnetite commonly employed in heavy-medium slurries to separate different minerals. Hence, Bureau metallurgists believe they may find a specialty application in recovering high-value minerals.

Emphasis at the Albany (Oreg.) Metallurgy Research Centre is on research that may support the contention by some metallurgists that uranium imparts exceptionally high tensile strength to steel. Bureau metallurgists at the Rolla, Mo., centre also are doing some work along these lines which eventually might lead to stronger steel for aircraft applications and other important uses.

At the Laramie (Wyo.) Petroleum Research Centre, depleted uranium in the form of uranium oxide is being tested as a catalyst in laboratory-scale refining of shale oil. Such experiments already indicate definite promise for depleted uranium in this application. However, further studies are necessary before the performance of this material as an industrial catalyst can be thoroughly evaluated.

Although the depleted uranium is not fissionable in the same sense as enriched uranium, it does present the problem of slight, but ever-present, radioactivity. Uses developed for this material must be licensed by the Atomic Energy Commission under its regulations covering source material.

This line of research does not, of course, present any further threat to the uranium industry, except, perhaps, to the extent that the " depleted " material might conceivably compete with the product as mined in certain very minor uses, nor is there any reason at this stage to foresee any serious competition to other metals in their established applications. In so far as the development of markets for its largest by-product would improve the competitive position of nuclear power generation, uranium producers might even stand to benefit from this research, if any worth-while success was achieved.

KING SOLOMON'S COPPER MINES

A recent issue of *The Jerusalem Post* contains a report by Beno Rothenberg of an expedition to the area around Timna, in Israel, from which it appears that the true site of the copper mines of Solomon has at last been discovered, together with a new understanding of the techniques the metallurgists employed.

While all archaeological reports about the area assumed that Solomon mined the green-blue chrysocolla deposits on the west side of Wadi Timna that are now being exploited by the modern copper mine, no one could explain how the Ancients smelted this ore, which contains only about 2 per cent of copper, by the heating processes which they knew. The first hint to the answer was given by the finding of lumps of copper sulphide containing about 45 per cent copper on the steep ridge dominating the Timna valley from the west. The assumption that this was the actual site of Solomon's mines was strengthened by the discovery of numerous man-made holes in the sandstone, together with a great many stone implements, granite mortars, dark basalt hammers and anvils, and red sandstone grindstones, as well as a number of pottery sherds, all undoubtedly of the 10th and 11th centuries B.C., the period of King Solomon. Systematic exploration of the whole of the 15-km. wall bounding the Timna valley in the west led to the finding of several other large copper mines, complete with implements, as well as many smaller mining sites. On the other hand, no sign of furnaces could be discovered.

Further investigation, carried out with the assistance of an expert metallurgist from the Timna Copper Works, supplied a solution to the riddle. It became evident that no smelting furnaces ever were built in Wadi Timna, nor were pottery crucibles employed. The copper ore was crushed and mixed with finely ground flux and charcoal, and slowly dispersed on to an open charcoal fire. Evidence regarded as conclusive was afforded by the discovery, underneath a big pile of slag, of a charcoal fire extinguished before burning out, showing the slag on top, the half-burned charcoal underneath, and a quantity of copper pellets at the bottom. The quantity of copper produced by one such fireplace at one burning was estimated at 5 to 10 kgs.

Solomon's experts apparently produced only raw copper in the Timna valley. This was sent to other plants for refining and casting into copper implements. There is some archaeological evidence for the assumption that the raw copper was sent north, in the direction of the Jordan valley. Some time ago, a " loaf of copper ", obviously ancient, was found in the ground near the spring of Ein Husb, and metallurgical analysis showed that it had probably originated from the Timna or Amram works of Solomon. There is also biblical evidence for the existence of metal workshops in the Jordan valley.

MINING IN THE CAMEROONS

The first of the various African territories scheduled for independence in 1960, the French Cameroons, which up to now has been under French trusteeship, celebrated its independence in January.

The French Cameroons, which lies off the Gulf of Guinea between West Africa and Equatorial Africa, covers about 161,000 sq. miles and has a population of 3,200,000, of which 17,000 are Europeans. The average population density is 16.2 per sq. mile, and ten per cent of the population live in urban centres.

Industry is mainly concentrated in the south, states a report in *East African Industry and Trade*, where it has the advantage both of the Port of Douala and cheap electricity from the Edea hydro-electric scheme which has a potential output of 1,200,000 mWh per annum. Edea has given rise to the Cameroons' one heavy industry, the Alucam aluminium works, which produces aluminium from alumina imported from France. Started in 1957, production last year was expected to reach 45,000 tonnes. In 1958, Alucam produced 31,851 tonnes of aluminium giving a turnover of 2,000,000,000 CFA frs. Meanwhile bauxite deposits have been found in the French Cameroons, but the great distance from Edea of the best deposits presents problems.

Still a relatively undeveloped industry, mining at the moment is limited to three products : cassiterite in the Mayo-Darle region (production in 1958 was 113 tonnes); gold in the East Cameroons (62 kg. in 1958), and rutile. A slump in the rutile world market, however, led to the closing down of the mines in 1957 and 1958 passed with no production.

Meanwhile prospecting and investigations are being carried out throughout the country. Deposits of iron have been found in Kribi, but the extent of these is still being estimated. The percentage of iron in the ore varies between 35 and 75 per cent.

Bauxite deposits to the order of 60 to 100 million tonnes with a 40 to 45 per cent alumina content were found recently in the Bamileke region. These deposits are of importance in that they are fairly near the Nkonsamba railhead. Meanwhile investigations have revealed the existence of a bauxite deposit between Ngaoundere and Tibati in the north, which, at first estimate seems to contain a very large tonnage of good quality ore. This deposit has the disadvantage of being about 300 miles as the crow flies from the coast, but it is thought that its exploitation would be justified if an ultra-modern alumina plant were built near the deposit, and a railway built.

Workable deposits of tin have been found in the Edea region. Prospecting has also been going on for oil and gas. Deposits of both have been found, but it is realized that considerable technical difficulties would be met in exploitation. In the absence of any coal in the country, gas and oil would be of great importance to industrial development. At the moment all fuels are imported.

U.S. Mineral Production in 1959

DESPITE a slight rise in the total value of mineral output in the United States in 1959, a number of commodities—principally metals where strikes suspended operations—did not follow the upturn in economic activity, reports the Bureau of Mines, Department of the Interior, in a year-end summary.

The Bureau, in preliminary figures, estimated the value of mineral production for 1959 at $17,100,000,000, compared with 1958's $16,500,000,000. The record, $18,100,000,000 was established in 1957.

Among the materials registering declines in total value in 1959 were lead, fluorspar, silver, iron ore, anthracite coal, manganese ore, mercury, copper, gold, and chromite.

A 116-day steel strike led to a 12 per cent drop in the value of usable iron ore produced and was the principal factor in decline in value of metals output, from $1,597,000,000 in 1958 to $1,550,000,000 in 1959. Large increases in the mining of uranium ore, bauxite, and molybdenum compensated for part of the reduced value for other minerals. A strike in the copper industry reduced the quantity of refined copper from United States mines nearly 16 per cent. Lead and zinc quantities also dropped, but the combined total value of copper, lead, and zinc rose slightly because of higher prices.

The value of non-metals output was $3,690,000,000, compared with $3,340,000,000 in 1958.

Bituminous coal and lignite production in 1959, estimated at 410,000,000 tons, was the same as for 1958. The expected gain for 1959 did not materialize because of the steel strike. The outlook at year's end was for an improved coal market in 1960.

Pennsylvania anthracite production was estimated at 19,500,000 tons, an 8 per cent decrease from 1958. Exports continued to decline, dropping 21 per cent below 1958. Apparent consumpton in the United States dropped 6 per cent.

Sales of natural and artificial abrasive materials advanced at least 25 per cent during 1959 as manufacturing rebounded from 1958 declines. However, the rate of abrasive sales decreased in the fourth quarter when automative and other industries curtailed operations because of steel shortages.

Domestic fluorspar production in 1959 was 180,000 s. tons —the lowest in over 20 years. Import and consumption rates for fluorspar recovered from 1958, but the upswing was slowed by the steel strike. Several domestic mines and mills closed early in 1959 soon after the termination of Government purchases.

Production of phosphate rock and potash increased 3 and 10 per cent, respectively, over 1958, largely because of increased demand for fertilizer.

Domestic production of Frasch sulphur was about the same as 1958, but faced increased competition from Mexican and Canadian imports.

Sales of boron minerals and compounds increased substantially during 1959, the closing of several boron high-energy fuel plants seemingly having little effect on sales of boron compounds.

The quantity of primary barytes sold or used in 1959 increased about 40 per cent. For the first time in more than 30 years, Kentucky reported production of this commodity.

Non-Ferrous Metals

Copper output from domestic mines in 1959 dropped approximately 16 per cent to the lowest since 1949 because of work stoppages that began in August at many of the principal copper-producing properties. Refined copper output from primary and secondary materials was similarly affected by strikes and fell about 17 per cent. Producers' stocks were the lowest since 1954 and were 48 per cent less at year's end than in the beginning of 1959. Total imports of unmanufactured copper rose about 10 per cent, whereas exports of refined copper dropped approximately 40 per cent. Consumption of refined copper rose about 10 per cent.

Following the upturn in general industrial activity, consumption of lead and zinc in the United States increased significantly in 1959. Strikes, however, restricted refinery production and caused heavy withdrawals from inventories. Low metal prices and strikes dropped domestic mine output of lead to 251,000 s. tons, the smallest since 1900.

Domestic mine production of zinc was at a high rate in the first half of the year, but fell sharply during the last half because of strikes. The result was that output was the same in 1958. Import quotas established in October 1958 continued throughout the year.

Iron Ore and Steel

The iron and steel industry experienced the longest strike in its history in 1959. Loss of steel production during the 116-day shutdown, which began July 14, caused many workers to be idle in the automotive, railroad, construction, and other industries.

Largely as a result of the strike, iron-ore output of 60,000,000 tons was the lowest in 20 years. This decline in iron-ore output was almost wholly responsible for the over-all drop in the value of the metal component of domestic mineral production in 1959. While domestic output was dropping, imports of iron ore gained. On the basis of 9-months' figures, the Bureau estimates imports for 1959 will approach 35,000,000 tons and thus break the 1957 record.

Despite the steel strike, the Bureau estimates that 1959 pig-iron output (60,000,000 s. tons) and steel (92,500,000 tons) will surpass 1958. They will, however, be well below the 1957 totals.

Light Metals

Primary aluminium production in 1959 was a record 1,950,000 tons, a 25 per cent increase over 1958 and 16 per cent greater than in 1956, the previous high year. Monthly records were set five times during the year and the peak production of 179,000 tons occurred in July prior to expiration of agreements between the major producers and the unions. These agreements were extended until after settlement of the steel strike.

Increased production of aluminium reflected, in part, the activation of new facilities during the year. By year's end, domestic capacity for primary aluminium had increased by 140,000 annual tons to 2,400,000 tons.

Domestic production of bauxite in 1959 was approximately 1,500,000 l. dry tons, a 14 per cent increase over 1958. Imports of bauxite were estimated at 8,000,000 tons, about the same as in 1958.

Domestic alumina plant capacity was increased by 800,000 s. tons per year to a total of 4,700,000 tons.

Production of primary magnesium in 1959 was 31,000 tons, an increase of 1,000 tons over 1958. Shipments of 46,000 tons were up 35 per cent.

The Alabama Metallurgical Corporation completed its 7,000-ton silicothermic plant at Selma, Ala., and production of magnesium from dolomite began in November.

Production of about 4,000 s. tons of titanium sponge metal during 1959 was slightly below 1958's. Consumption was approximately 3,200 tons or 1,000 tons less than in 1958. Production and consumption of titanium metal during the first half of the year was at a considerably higher rate than in the last half when the steel strike caused many titanium-metal processing plants to close. The price of titanium sponge continued downward, dropping about 12 per cent from 1958.

Domestic production of ilmenite was approximately 600,000 s. tons, 6 per cent higher than in 1958, but rutile output was only 2,000 tons, or about one fourth the 1958 total. Imports of ilmenite, including titanium slag, were estimated at 370,000 tons, about 6 per cent more than in 1958. Rutile imports declined for the second year running and were approximately 20,000 tons. A continuing oversupply of rutile in 1959 caused a drop in price to $85 a s. ton.

Greater domestic output as well as imports of titanium slag were in response to an increase of about 20 per cent in the production of titanium dioxide pigments, which consume most of these materials.

Quicksilver and Ferro Alloy Metals

Domestic mine production of quicksilver in 1959 declined for the first time since 1950. Total production was 31,500 flasks, nearly 20 per cent less than in 1958. Output from all major mercury-producing States, except Alaska, was down. Industrial consumption however, remained high and probably exceeded 50,000 flasks for the fifth consecutive year. Imports remained unchanged at 31,000 flasks.

Molybdenum production gained despite strikes at several copper plants that sharply curtailed the output of byproduct molybdenum.

Tungsten was produced in 1959 by only two mines—the Pine Creek mine of Union Carbide Nuclear Co. in California and the Climax mine of American Metal Climax Inc., in Colorado.

Chromite production declined about 20 per cent, compared with 1958. Virtually all production was from the Mouat mine in Montana.

The Calera Mining Co., which produced about 65 per cent of the total United States cobalt in 1955-58, closed its mining, milling and refining facilities in Lemhi County, Idaho, during the latter half of 1959.

Production of vanadium pentoxide was resumed in 1959 at the Rifle, Colo., mill of the Union Carbide Nuclear Co.

The Government's purchase programme for domestic manganese ore ended August 5. Preliminary estimates show that domestic manganese ore production for 1959 was substantially lower than in 1958.

Gold, Silver and Platinum

Mine production of gold and silver in the United States continued to decline in 1959. The decline in gold production was attributed principally to the drop in byproduct output resulting from shutdowns in the copper mining and smelting industry. The 1959 output of gold was approximately $54,800,000, a drop of about 10 per cent from the $60,800,000 of 1958. Silver output was approximately $27,100,000, about 12 per cent lower than 1958's total of $30,900,000. Output of platinum-group metals recovered from domestic placers and from byproduct sources was the lowest since 1940.

Uranium

Uranium ore production in the United States totalled about 6,800,000 tons valued at over $140,000,000, compared with 5,200,000 tons, valued at $116,000,000, in 1958.

Domestic concentrate production in 1959 was about 16,200 tons of uranium oxide, compared with 12,560 tons in 1958 and 10,000 tons in 1957.

Rare Metals

Mine shipments of rare-earth metals and thorium ores and concentrates in 1959 totalled about 1,800 s. tons, valued at $318,000. Of this total, 1,280 tons of monazite, bastnasite, and euxenite concentrates contained an estimated 700 tons of rare-earth oxides. The mine of Monazite and Mineral Ventures, Ltd., Union of South Africa, which had been the major foreign supplier of monazite to the United States in 1958, stopped operations in March 1959 because sales contracts had not been renewed.

Domestic production of zircon concentrate rose sharply. Imports, principally from Australia, but also from the Union of South Africa and Nigeria, were estimated at 50,000 s. tons. Price near year's end averaged slightly more than $50 a ton, an increase of $5. Production of zirconium sponge, almost entirely reactor grade, was about 1,400 tons, an increase of 8 per cent. The year-end price was about $6 a pound. Late in 1959, output ceased at one plant.

Estimated hafnium production for the year was 65,000 lb. The Atomic Energy Commission placed successive 6-month contracts for reduction of byproduct hafnium oxide to sponge and awarded a separate contract for independent hafnium production based on Nigerian high-hafnium concentrate.

U.S. domestic production of columbium-tantalum concentrate, as measured by pounds of columbite-tantalite, plus pounds of columbium-tantalum oxides contained in euxenite, declined 56 per cent in 1959 from the record high of 1958. This was due to closing of the euxenite mine of Porter Bros. Corp. at Bear Valley, Idaho.

Columbium metal production in the United States more than doubled in 1959 for the second consecutive year, and output of tantalum metal increased more than one-third. Prices for columbium ingot dropped to about $35 a pound and for tantalum ingot to $45 a pound. Earlier in the year both metals had brought $65.

About 350 s. tons of hand-sorted beryl was produced in the United States in 1959 and was sold mostly to the Government for premium prices. From 1952 through October 1959, the General Services Administration bought 2,428 s. tons of beryl on the Federal Purchase Programme for the domestically produced mineral. Nearly all the 6,200 tons of hand-sorted beryl consumed in the United States in 1959 was imported. The beryl was processed into beryllium metal, alloys, and compounds.

Germanium supply and demand increased sharply in 1959 as the number of germanium transistors, diodes, and rectifiers manufactured during the year passed the 100-million mark—more than double the 1958 output.

Production of selenium and tellurium increased in 1959 despite sharp curtailment during the second half of the year due to the copper strike. A brisk demand for tellurium and selenium prevailed throughout the year due to their wider use as semiconductor materials in the electronics industry, especially tellurium for thermoelectric devices. The price of selenium remained unchanged in 1959, while that of tellurium increased from $1.65 a pound to $2.50.

Interest in caesium and rubidium continued to grow as the metals found wider use in space, nuclear, and other research and development programmes. Ion rocket-engine fuel and direct conversion of nuclear heat to electricity by caesium were among the applications being studied.

Electric Smelting On Approval

On Tuesday of this week the Birlefco pilot electric smelting furnace was inaugurated at the Aldridge, Birmingham, premises of Birlec-Efco (Melting) Ltd. While the company naturally is interested in the application of this furnace in Britain, it nevertheless feels that there is even more scope for its employment overseas. The company feels also that a reduced cost of electricity in the United Kingdom would prove less restrictive

OVER £50,000 has been invested by Birlec-Efco (Melting) Ltd., in a scheme that will assist rapidly developing countries to exploit their mineral resources. The chief advantage of the scheme is that firms contemplating the installation of a production-scale electric smelting plant will be able to assess the practicability of their plans without incurring capital expense. Indeed, this is the first time in this country that a contract service has been available for electric smelting.

A Birlefco pilot furnace has been built at Aldridge to test mineral ores, on a contract basis, for their amenability to electric smelting. Particularly where hydro-electric resources are available, the electric smelting process can economically be used for the extraction from their ores of nickel, copper, manganese, iron, ferro-alloys, and other materials. Trial batches of ore will be accepted from any part of the world for testing on a miniature scale in the furnace. On completion of the test, a detailed report will be submitted, giving recommendations on smelting practice, electrical ratings, and size of full-scale installation required for a given output.

It is believed that the scheme will be specially attractive to mining and metallurgical concerns in the Commonwealth, particularly in Africa and India where the company and its associates has already installed a total of nine electric smelting furnaces with a combined rating of 36,000 kVA.

The furnace, with a shell of 8 ft. internal diameter, is situated at one end of a building specially designed and built for the purpose. It is surrounded by a charging platform at a height of 9 ft. from the main floor level. The furnace controls are suitably housed in a panel adjacent to the furnace operating platform.

With a nominal rating of 350 kVA, the furnace is designed to be as versatile as possible. A wide range of voltage tappings have been provided enabling, as far as is practicable, the whole range of electric smelting applications to be covered.

To determine the effect of shell rotation for different smelting operations, the shell can be rotated or oscillated in either direction at varying speeds.

Three tapholes are provided, the levels of which can be altered for slag and metal. They are served by a mono-rail beneath the platform, forming a loop surrounding the shell. The mono-rail carries slag pots or metal ladles.

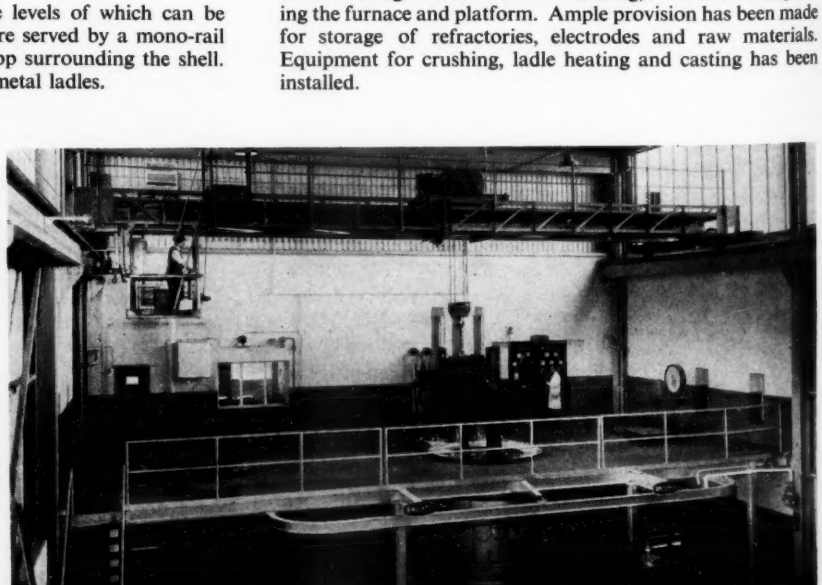
Several thermo-couples are built into the refractory lining to monitor the temperature of the hearth and sidewalls at different points.

The furnace is equipped with holders suitable for 8-in. diameter electrodes which can be amorphous carbon or graphite according to the requirements of the tests. Smaller electrode holders can be fitted if necessary. The electrode clamps are arranged for remote control by pneumatically-operated cylinders.

The furnace is designed so that it can operate as an open-top furnace or the top can be closed by the super imposition of a roof. It is also arranged for fume removal or gas extraction.

The furnace is capable of smelting calcium carbide, iron ores, manganese ores, production of ferro-silicon and ferro-chrome, nickel and copper concentrates and treatment of slags, and many other electro-thermal processes. It is available to any company interested in carrying out tests on electro-thermal processes. The installation has laboratory facilities, and a competent staff to carry out the development work for which it is intended.

The building specially designed to house the Birlefco pilot smelting furnace has a total floor area of 5,700 sq. ft. The main contractors for its erection were Robert M. Douglas (Contractors) Ltd. It is served by a 5-ton overhead travelling crane, the maximum height of lift being 26 ft. The substation, which is integral with the main building, is in an area adjoining the furnace and platform. Ample provision has been made for storage of refractories, electrodes and raw materials. Equipment for crushing, ladle heating and casting has been installed.



General view of Birlefco pilot smelting plant showing operating platform. Adjustment is being made to the setting of one of the three amorphous carbon electrodes by means of the 5-ton overhead travelling crane

THE WORLD NEEDS MORE NEW GOLD — I

This is the first of two extracts from a paper entitled " The Price of Gold ", by D. R. Williamson and Lorraine Burgin (*Colorado School of Mines' Mineral Industries Bulletin*, Nov. 1959), which are here reproduced by permission of the Colorado School of Mines.

GOLD producers throughout the world have long been clamouring for public recognition of their problems. In recent years the United States gave up a notable part of its great advantage in world trade and, with it, a part of the recently accumulated, large stock of gold. This has caused renewed efforts on the part of the domestic miner to bring about major revisions in the law. Many economists, politicians and others of several nations have long argued for some of the same revisions, although for entirely different reasons.

Because gold is not much consumed and only a small part is dissipated or lost, most that has been produced through all of time is still available, largely stored in public or private treasuries. Each nation's share of the supply has world-wide effect, and within the nation it affects every facet of life. This wide-spread influence is intricate. Its problems are so interlocked that a good, overall appreciation is had by comparatively few persons. Apparently no clear-cut solution exists for the problems, since not even the world's best informed men can agree.

Some of the gold producers' problems are almost unique to their business. The metal has a steady price, independent of supply and demand, that is not affected by steadily mounting production costs. Although gold is essential for financing wars, production is discouraged during conflicts in order to conserve manpower. Gold is controlled by laws and regulations that only occasionally are influenced by producers' needs. Many entire gold districts have been exhausted during the history of man, and the area that possibly might contain undiscovered deposits is continually shrinking. The rate of production and new discoveries seem unlikely to decrease in the near future, but the present great shortage of gold probably will increase. Present ores contain as little as one part gold in 400,000 parts of waste. Future ores probably will be even lower grade. Since gold is used repeatedly, suffering no loss in value, recovery of all that is in a deposit is particularly worth while.

Gold as Backing for Money

The most important use for gold is as money or as backing for money, but even monetary experts are far from agreement as to *how* it should be used. A few theorists have stated that gold reserves are not even needed and that, since gold has little practical use, it can have no value. Man always has coveted gold, nevertheless. An international standard for all the world's moneys is essential. Under-pricing gold tends to make financial structures sound.

As more sophisticated money systems were developed, they depended less upon physical transfer of gold. The trend, of necessity, probably will continue, but complete independence from gold is not now possible. The need for additional gold has increased more rapidly than growth in population. Redistribution of the available supply cannot make up for the overall shortage. By increasing the price, gold could be made to support more currency, but the price cannot lightly be raised. There appears to have been little alternative in the past, however, when the supply became insufficient.

Several types of money have been tried by all nations during very different times. All, sooner or later, were found to be inadequate; persistent adherence to any system apparently never has been possible.

The proportion of the total world's gold that is held by a country is of more import than the absolute amount itself. With only ten per cent of the people, the United States now has more than half the total official reserves of all the Free World. Private, unknown extensive hoards exist in some parts of the world. By trade and the influx of wealth the reserves increased 14,000,000,000 dollars, 270 per cent, during the 1934-1941 period, although domestic consumption almost equalled production. Peoples obviously need, and generally acquire, gold more according to their productive capacities than to their numbers. More gold reserve is synonomous with ability to command a larger share of the world's wealth.

Money structures of the world are having difficulty in handling just the present, necessary work. An increased, or possibly new, burden would probably make a higher price for gold necessary. Thus far, however, the United States is continuing to resist an increase in price. Disadvantages are deemed to be greater than advantages.

Production of HG^{198}

In searching for a universal, unchangeable standard for measurement of distances, scientists turned to the wavelength of light. That emitted by the vapour of heated cadmium was much used, but narrower, monochromatic spectral lines were soon found to be necessary for even greater accuracy. Single wavelengths of light are emitted only by single isotopes of one of the elements. Not all elements are suitable—some, for example, require too high a temperature for emission of light. The best answer thus far has been found to be Hg^{198} that is produced by neutron bombardment of gold. Gold has but a single isotope, hence transmutation forms only the one isotope of mercury. A single isotope cannot be separated in such pure form from natural mercury by any known means.

Usable quantities of Hg^{198} began to be made at Oakridge, Tennessee in 1945. Quantities of high purity gold are being produced at present for such purposes by at least the American Smelting and Refining Company. Although use of such sensitive means of measurement probably will much increase, gold consumption always will be very small.

Other Uses

The manufacture of jewelry and ornamentation of many kinds annually consumes large quantities of gold in most countries of the world. Plating, goldware of all kinds, foil, inserts, lace, gilding, binding, lettering, interior decoration, and inlays are some of the more important of the miscellaneous uses. White, green and yellow gold are all used, but it usually is alloyed with copper, silver, nickel or palladium to improve hardness and wearing qualities. The amount of gold in the alloy is specified by a number of " carats "—one carat is one part gold in 24 parts alloy.

Glassmaking, the chemical industry and dentistry consume steady small quantities of gold. It has even been incorporated in a liqueur in Europe. Scientific applications are increasing as the need for materials with unusual properties increase. A 5 micron diffusion plate support has been made for a highly corrosive, gaseous, fluidized bed reactor by coating platinum mesh with gold. Parts of aircraft, missiles and satellites are coated with gold because it is an excellent reflector of infra-red radiation. A coat of about four-millionths inch thickness adequately protects and has been used on the F-100, F-101,

Redstone, Jupiter and Polaris planes and missiles. Applications are for engine shrouds, drag-chute containers, tail assemblies and blast shields. The surface of at least one satellite has been so coated.

Need for New Gold

The world's population constantly increases with a very appreciable increase in rate. Greater individual productive capacity and ability to trade add still another annual increment to the need for more money. During the last twenty years, according to several estimates, gold reserves have increased from 1.5 to 2 per cent per year while the need for money has increased 7 per cent per year. World trade in recent years increased from 5 to 6 per cent annually.

In recent years world trade so far exceeded the supply of actual money, that it has been possible only by unprecedented loans and grants. Trade agreements are increasingly made which involve little transfer of money—it has often become merely a unit for bookkeeping entries.

Even though only a part of all trade is done by means of transfer of money, the amount of money must increase with the increase in that part. So long as a money system has a gold base, the quantity of money can increase only by increasing the amount of gold in the treasury, by decreasing the amount that is required for backing, or by increasing the price of gold.

To have kept up with the need for money in recent years, the gold reserve of all the world would have had to increase about 300 per cent more than it actually did. Even reserving all production for monetary purposes would not have attained such an increase. At one time the United States had 60 per cent gold backing for its currency. The legal requirement was reduced only 14 years ago from 40 to 25 per cent. Such small backing *requires* that currency be made inconvertible, and still less backing prevents maintenance even of the pretence of a gold backing. Obviously the present U.S. reserves, priced at $35 per ounce, are already overloaded. That they are envied by other nations indicates the status of their reserves.

The authors of this survey, after discussing the arguments currently being put forward for and against an increase in the price of gold, give as the principle reason why a price increase is inevitable, despite comparatively short range objections, that the gold basis for money is steadily decreasing while the need for still more money increases.

No Help for U.S. Gold Producers

Although monetary gold admittedly is insufficient throughout the world, the lack of interest in increasing reserves, it is stated, can be seen in several actions. Apparently very little restriction is placed on the sale of gold for use in jewellery and the arts, and no effort is currently being made to recover any of the large amount that already exists in those forms. Perhaps half the gold produced in foreign countries is sold on the world market and is largely lost to the Free World's treasuries. Most of the production is made by American and English mining companies. No special official efforts are being made to see that more new gold is produced or that deposits are as completely mined as feasible. In the United States exploration and mining are officially aided when the material is deemed to be worthwhile. No help is extended to gold operations. The U.S. Bureau of Mines and the Geological Survey greatly aid production of many materials by free, intensive investigations when the material is of national interest. No investigations have been made for the purpose of increasing gold production or discovery of new deposits. Mines were allowed to deteriorate during and since the last war.

NEW PROCESS FOR PRODUCING REFINED COBALT

A MAJOR modification of the process for producing cobalt is being put into operation on the Northern Rhodesian Copperbelt as a result of research in the laboratories of the Anglo American Corporation Group, states the quarterly review *Optima*. It will now be possible to extract a much greater proportion of the cobalt contained in the concentrates, and to recover the copper content more economically.

For the past quarter century, Rhokana Corporation has been an important producer of cobalt, which is recovered in the course of operations for producing copper at Nkana, Northern Rhodesia. During that time progressive improvements have been made in the processing techniques.

Up to 1952, cobalt was produced in the form of a cobalt-iron alloy, which was then sent overseas to be refined and sold. In 1952, however, an electrolytic process was commissioned for the treatment of cobalt-copper sulphide concentrates, and this represented a major step forward in efficiency and economy. It yields metallic cobalt of consistently high purity, in the form of both cathodes and granules, ready for the market. In this process, granules are produced by melting cathodes in an electric furnace and pouring the molten metal into a moving bath of water.

A disadvantage of this process is that the copper content of the concentrates is rejected into the residue from the plant as a low-grade product, and this product has to be smelted to extract the copper. The recovery of copper in this manner has proved to be both costly and difficult.

Research in the group's laboratories continued in an effort to overcome this difficulty, and it has now resulted in the successful development of a major modification of the electrolytic cobalt process, which not only yields a much higher extraction of cobalt from concentrates, but also recovers the copper content as electrolytic metal.

The existing plant is now being modified and extended to incorporate these improvements, and it is expected to be ready for operation on the new basis early in 1960.

The essential difference between the existing and the improved processes lies in the equipment and technique used for roasting the concentrates. In the existing process, multiple hearth roasters extract only part of the cobalt content of the concentrates in a form that is soluble in water. In the new method, a process known as "fluidized bed roasting," with careful control of the temperature, will render most of both the cobalt and the copper content soluble in a dilute acid leaching solution. The residue from the acid leach pulp will be separated and rejected as waste, and the pregnant solution, containing copper and cobalt, will pass to electrolytic cells, from which high-purity copper will be recovered.

Cobalt will then be separated from the spent electrolyte by a special technique, and will be recovered as purified cobalt hydroxide. This, as in the existing process, will then proceed to the final stage for the production of cobalt metal by electrolysis.

DEVELOPMENTS IN CHINA'S COAL INDUSTRY

SINCE 1949, high priority has been granted to the rehabilitation and expansion of China's coal mining industry as one of the primary essentials in the total development of all heavy industries.

Impressive records have been achieved in the coal mining industry of Communist China since the beginning of the programme. Production had reached a peak of 61,900,000 tonnes during World War II (1942) but in the period of the Third Civil War (1946-48) the output of coal dropped to an estimated 16,000,000-19,000,000 tonnes annually. The reconstruction period (1949-52) heralded the beginning of a new era in the coal mining industry. As the new regime progressed, a record of 3,600,000 tonnes was established in 1952, the last year of the reconstruction period. The impetus continued under the First Five-Year Plan (1953-57) and by the end of this period production had reached an annual total of 130,000,000 tonnes. Under the current Plan (1958-62), further progress in coal output is being accomplished. In 1958 production of coal more than doubled that of 1957 and statistics were released indicating an output of 270,200,000 tonnes. The revised target of 335,000,000 tons production in 1959 is expected to be met, on the basis of production performances registered in the first 6 months of the year.

An important factor in the spectacular growth of China's coal industry has been the intensive country-wide geological surveys which are reported to have located new coal deposits containing a wide range of coal types. Estimates of Communist China's coal reserves have been as high as 9,000 billion tonnes. Another published revised estimate of 309,610 million tonnes has been reported. Other estimates of reserves range from 444 billion tonnes to 1,000 billion tonnes.

Rehabilitation of over 100 existing coal pits and the development of more than 130 major new mines in recent years has added over 150,000,000 tonnes to China's annual production capacity. These collieries are all state-owned, centrally administered, and are reported to be equipped with modern machinery. Coal mines operated by the Ministry of Coal Mining, in 1958, produced 157,700,000 tonnes of the national total of 270,200,000 tonnes. Provincial and locally administered coal mines' output amounted to 112,500,000 tonnes.

Present Developments

Present developments in Communist China's coal industry indicate rapid advances in the development of hydraulic coal mining. Hydraulic coal mining equipment has been installed in a number of workings accounting for 1.3 per cent of the total output in 1958. The plan for 1959 called for the production of an estimated 10,000,000 tonnes by this method.

Improvements in all methods of coal extraction have greatly influenced the development of the Chinese coal industry. Coal is obtained principally in underground workings where mechanical methods in mining play the most important role. Radical changes have taken place in the methods of coal extraction. Whereas previously the basic implement of work was the miner's hand pick, the combine is rapidly becoming a principal medium in the production. Over the period 1953-58 the percentage of China's total coal output produced by combines has increased from 0.7 per cent to 5.4 per cent, while the output from manual labour (miners and other face workers) dropped to 3.0 per cent in 1958 compared with 16.5 per cent in 1953.

Although mechanization in the coal mines of China has developed at a rapid pace, manual labour continues to play a very important role in the amazing growth of the industry. In 1958 mechanized mines accounted for 31.8 per cent of the national output of coal. Curiously, this represented a decline from the previous year for the reason that in order to accomplish the goals of the "Leap Forward" programme, large cadres of workers were mobilized in an intensified programme to step up production of coal. The result was that, while the stepped-up production programme was successful, it was accomplished largely by non-mechanized effort. Manual labour accounts for the largest portion of coal loaded although this position will be lessened gradually by the introduction of improved processes.

The source of this information is *Mekhanizatsiya i Avtomatizatsiya Proizvodstvo* (Mechanization and Automation of Production) No. 10, Moscow, October 1959.

Production in 1959

A report broadcast by Radio Pekin states that last year not only were national industrial output targets for the year reached but almost all targets set for the end of the five-year plan 1958-1962 were attained. Output figures for 1959, with percentage increases over the previous year, included: pig-iron, excluding small-scale production units, 20,500,000 tonnes (plus 115 per cent); raw steel, excluding small-scale production units, 13,350,000 tonnes (plus 67 per cent); coal, 347,800,000 tonnes (plus 29 per cent); salt, 11,040,000 tonnes (plus 6 per cent); and electrical energy, 41,500,000,000 kWh (plus 51 per cent).

Analyzing the results of the coal industry's operations last year, it is reported elsewhere that about 60 per cent of the output—and probably a larger percentage of the increase—is accounted for by the larger mines, of which China now has 15 with an annual output exceeding 5,000,000 tonnes and seven with an annual output exceeding 10,000,000 tonnes. These have been supplied, during the past year, with more mechanical equipment for cutting, loading and transporting coal, much of this being of Chinese manufacture, though a good deal has been imported from various manufacturing countries which make no difficulties about its supply. It is claimed that as the result of this mechanisation, and also of a campaign of emulation among the miners, the coal output per working face had been increased by last November to 10,000 tonnes a month in 25 per cent of the faces, raising the average over the whole industry to 6,850 tonnes a month, an increase of 10.6 per cent on 1958.

The number of new shafts sunk during 1959 was over 180, with an aggregate capacity greater than that of all the shafts sunk during the first Five-Year Plan and in 1958, and it is further stated that the average time taken in the sinking of these was only 30 months, as compared with 4 years during the first Five-Year Plan. Some 60 of these shafts are in the Southern Provinces of China, once regarded as being devoid of coal, where large coal reserves have been located.

Simultaneously with the increase of coal production, steps have been taken to expand coal-dressing and coking facilities, to meet the growing demands of the iron and steel industry. During 1959, 5 large modern plants and 33 smaller ones of a more primitive character were brought into operation. This represents an increased capacity of the order of 70,000,000 tonnes, which is more than five time the total increase during the previous nine years.

MINING MISCELLANY

Soviet engineers are at work now on the plans for an expansion of the Kim Chak Iron and Steel Works, at Chongdin, in North Korea, which will make it one of the largest in Asia. With its completion, the output capacity of the iron and steel industry of North Korea will be increased six-fold.

★

Detailed plans to expand annual production to about 500,000 tons of potash and 10,000 tons of bromine in the Negev, have been drawn up by the Dead Sea Works in view of the visit of a World Bank survey team expected to arrive in spring.

★

The annual reports of two of France's leading producers of iron ore, both record little change in production. De Wendel et Cie reports an output for the year of 6,390,000 tonnes of iron ore, as compared with some 6,470,000 tonnes in the previous year, despite considerable rises in the production of pig-iron and raw steel. The same picture is to be seen in the results of the Lorraine-Escaut concern, whose ore output totalled 5,000,000 tonnes. The latter company has plans to extend ore-working plant; in the first quarter of the current year a new breaking and agglomeration unit will come into full operation at its Longwy plant, while work continues on the erection of an ore concentration installation at Metzange.

The Yugoslav investment fund has granted credit worth hundreds of million dinars for the further expansion of the copper production units at Majdanpek-Bor which will eventually reach an annual output of 3,600,000 tonnes. A contract worth some 2,900,000,000 French francs has been placed with the Paris concern Compagnie des Ateliers et Forges de la Loire by the Belgrade foreign trade organization Jugotehna for the complete delivery, installation and trial operation of copper and other non-ferrous metals production plant for the Bor site. Delivery is to be at the end of the current year, together with plant for the manufacture of sulphuric acid from the same concern.

★

It is reported that a new district containing occurrences of manganese has been outlined in the Province of Santiago del Estero, Argentina. The district in question is situated in the sierra of Ambargasta, in the department Ojo de Agua, where from time to time discoveries of this mineral have been reported. The grade is reported to be high. The government of the Province has decided to study the question of arranging credit facilities to assist small miners to mechanise their operations.

★

An order for 300,000 tons of bituminous coal secured from Burma by the Natal Associated Collieries will form the first major export of coal from South Africa for nearly 10 years. The first shipment is expected to be delivered in March. The order was secured in the face of competition from Chinese, Indian and Australian producers.

★

The Quebec Mines Minister, Mr. W. M. Cottingham, has announced a major discovery of asbestos in the Ungava region of Northern Quebec. It was stated that the drilling programme had established the presence of some 7,000,000 tons of asbestos comparable in quality with the best from Quebec's Thetford Mines area. The site of the discovery is about 30 miles from Deception Bay, in the area included in what has often been termed the "nickel belt" between Cape Smith and Wakeham Bay.

★

The Boliden Gruvaktiebolag has started operations on a regular scale in Sweden's second largest lead mine, situated in Vassbo, near Idre, in the province of Dalarna. The lead deposit has been estimated at about 3,000,000 tonnes and yearly production is expected to be 150,000 tonnes. The lead will be transported by rail and road to the Boliden refinery at Roennskaer, which last year supplied about 86 per cent of Sweden's requirements and is large enough to fill completely the country's domestic needs. Some 20,000,000 kronor have been invested in the Vassbo mine.

★

The Governor of the Province of San Jan, Argentina, Dr. Américo Garcia, has announced the discovery of a copper deposit which outcrops over an area of 170 sq. ms. The deposit is situated at an altitude of 4,500 ms. above sea level. This discovery is described as the first result from a programme of mineral exploration undertaken by the Executive Authority to mobilise the Province's natural resources. By an agreement concluded with a North American company, the government of the Province recently secured the services of a group of expert geologists, with whom a number of Argentine technicians are associated in this survey.

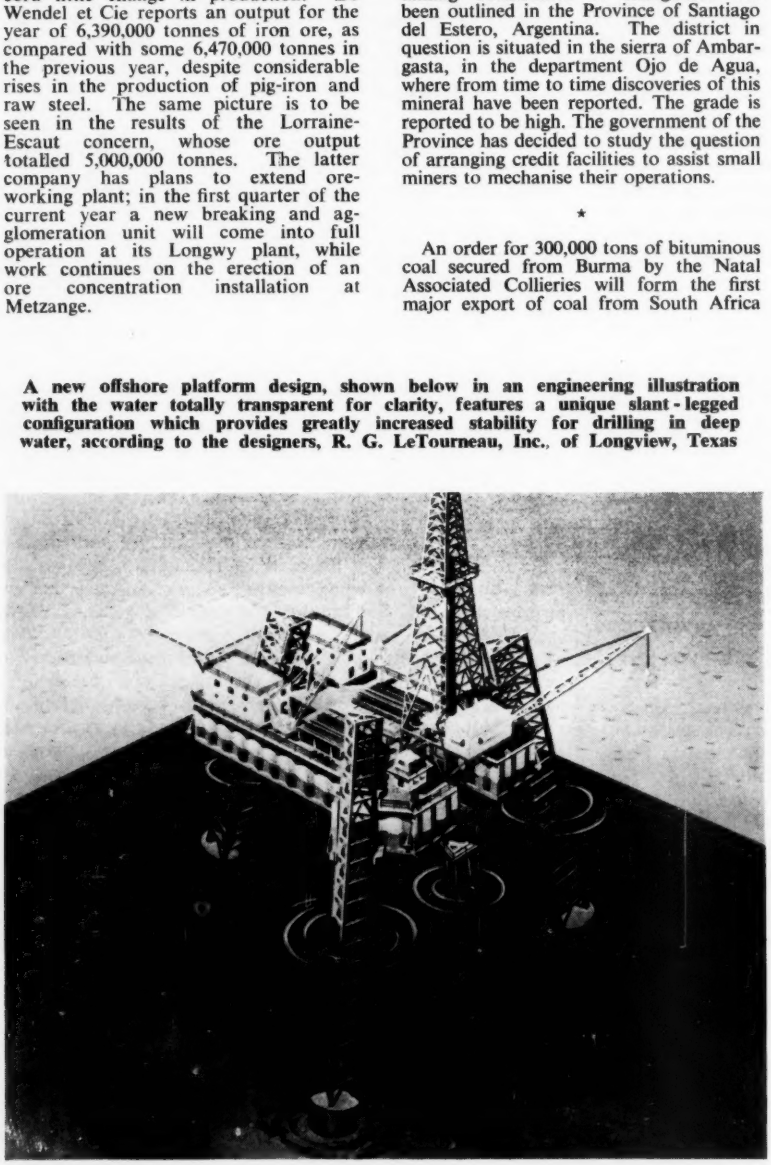
★

Alcoa has successfully operated at its Badin, North Carolina, smelter, a new rectifier which permits production of up to 4 per cent more primary aluminium per unit of electricity consumed. Believed to be the world's most powerful silicon rectifier, this unit is rated at 10,000 amps and can deliver 6,000 kW. of power from only 312 silicon cells. It also represents the most comprehensive use of aluminium to date in the construction of large rectifiers. About 60 per cent of the assembled weight is Alcoa aluminium.

★

The bulk of a sweeping programme of modernization and development at the New Caledonian nickel mines was completed last month, when the fourth furnace of the French mining company Le Nickel started operations. New Caledonia is expected to produce 18,000 tonnes of nickel (in all forms) this year. This expected result became possible because of additional power supplied by the Yate dam, inaugurated at the end of 1959.

A new offshore platform design, shown below in an engineering illustration with the water totally transparent for clarity, features a unique slant-legged configuration which provides greatly increased stability for drilling in deep water, according to the designers, R. G. LeTourneau, Inc., of Longview, Texas



The leading Philippino refractory chrome ores producer, Consolidated Mines Inc., has announced that in the current year its exports of such ores will amount to some 28,500 tonnes.

★

The lead-zinc mines in the Yugoslav areas of Kossovo and Metchija minority—are to be expanded, states a comment from Belgrade.

★

Exploratory drilling operations at the Khetri copper mines, 80 miles from Jaipur, India, are scheduled to be completed within three months. The operation is conducted by three teams of engineers and technicians of the Indian Bureau of Mines, assisted by U.S. and Polish experts. It is expected that a copper smelter will soon be erected in the Khetri area. From results obtained so far, the quality and percentage of copper would warrant mining on a commercial scale, according to Dr. Dewaa, Director of the Indian Bureau of Mines.

★

The Soviet scientist M. Somov, Doctor of Geographical Science, writing in the Moscow daily newspaper *Izvestia* on January 29, estimated that there are very large deposits of gold, uranium, diamonds, beryllium and iron in the eastern part of the Continent of Antarctica, in the extreme east of which coal has already been located. He considered it quite possible, that considerable deposits of gold, tin, copper and lead are to be found in the western part.

★

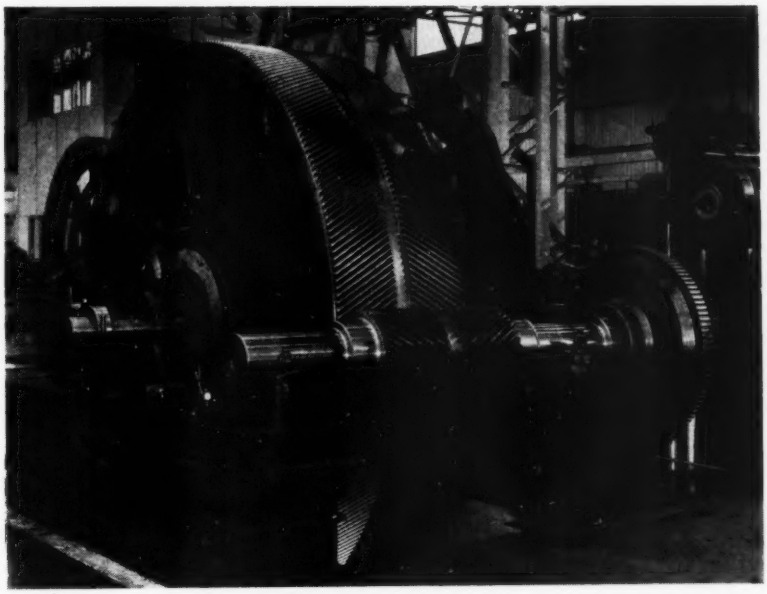
The Government of India has decided to undertake the manufacture of sulphur from domestic pyrites. This decision has been taken on the basis of a report submitted by the Indian Bureau of Mines which indicated that sufficient reserves of pyrites were available at Ajmer in Bihar State.

★

A German - Austrian consortium has signed a contract to construct an L.-D. steelworks near Bilbao, Spain, for the Altos Hornos de Vizcaya concern. Three companies belong to the consortium — Krupp, the Gutehoff - nungshutte concern and the Austrian Voest. It is planned to start production in 1962 with an annual capacity of 350,000 to 400,000 tons of crude steel, but the plans are such that a subsequent enlargement to 750,000 tons is possible.

★

The Government of Madhya Pradesh, India, has taken a policy decision to leave the exploitation of radioactive minerals in the hands of the private sector in the State. Rich deposits of different kinds of radio-minerals have been discovered in the districts of Sidla and Shahdel. Three veins of beryl-bearing substance varying from 200 to 300 ft. in length and 80 to 240 ft. in width, have been found in the Barganwa area of Sidhi district, and the possibilities of richer occurrences of beryl in the area are not excluded. Similar radioactive minerals have been located on the right bank of the Beoharia river in the Shahdel district.



This 17-ton double helical hobbed gear, one of the biggest sets of this type to be made in South Africa, was produced by David Brown Precision Equipment (Pty.) Ltd., Benoni, Transvaal. The gear was supplied for installation in the service hoist of a Far West Rand gold mine. It has a dia. of over 11 ft. at an overall face width of approx. 35 in. There are 294 teeth in the fabricated steel wheel and 36 in the pinion

PHYSICAL PROPERTIES OF DIAMONDS

A unique machine which can change the colour and physical properties of diamonds by means of hard X-rays and Gamma rays was set in motion at the Diamond Research Laboratory in Johannesburg on Friday last week by Mr. H. F. Oppenheimer, chairman of De Beers.

In the Physics Section of the Diamond Research Laboratory, the physical properties of diamonds are studied in an endeavour to find new and varied applications of the diamond in science and industry. A high-tension Cockroft-Walton-type cascade electron accelerator is part of the equipment. This instrument, built into a separate and specially designed building, is capable of giving a maximum electron beam current of 3.0 milli-ampere at a maximum working voltage of 1,400,000 volts, and both the beam current and voltage are continuously adjustable up to the maximum rating.

The machine itself is used to accelerate electrons to an approximate velocity of 180,000 miles per sec. for the bombardment of diamonds, thereby altering their hardness, electrical conductivity, surface structure and other physical properties. Alternatively, the electrons can be directed to strike a target of tungsten, resulting in the generating of high energy gamma rays. These rays, in turn, cause radiation damage to the diamond and their effects are being investigated as well.

The machine will be used in experiments in changing the properties of diamonds and in doing so may, incidentally, affect the colour of the diamonds. It is not intended to use the machine for the specific purpose of changing the colour of diamonds.

COMPANY NEWS

The Mond Nickel Co., is arranging a Conference and Exhibition entitled "Confidence in Plating", which is to be held at the Engineering Centre, Birmingham, February 23-25, from 10 a.m. to 6 p.m. The recent announcement in the National and Technical Press of a new British Standard from chromium nickel plating in conjunction with a labelling scheme has created widespread interest throughout industry, and Mond Nickel, who have launched a campaign in the interests of better plating, are hoping to encourage the public to look for the special lables indicating quality which they are providing. Details of the exhibition and conference are available on application to the company.

★

Henry Wiggin and Co. are holding an exhibition entitled "Wiggin Nickel Alloys in Industry", at Park Lane House, London, W.1., March 21-25, from 10 a.m. to 8 p.m. (closing 5 p.m. on March 25). The aim of this exhibition is to help engineers and designers to make the best use of the specialized alloys which this company manufacture. The company's technical staff will be available to answer visitors' queries, and films will show the applications and fabrication of Wiggin products.

★

F. Perkins Ltd., diesel engine, outboard motor and gas turbine manufacturer, announces that it has formed an overseas manufacturing operations division to investigate, organize and give evidence on overseas manufacturing projects. The new division will operate in close collaboration with Perkins Engines, Ltd.

Machinery and Equipment

South African Coal Preparation Plants

The British General Electric Co. (Pty.) Ltd., Johannesburg, which represents The General Electric Co. Ltd. of England in South Africa, has received contracts for two coal preparation plants worth approximately £230,000 to the company. The Chance sand flotation process will be employed in both installations and the plant will be supplied by G.E.C. The primary screening and conveying sections of the plant will be provided by Robins Conveyors (S.A.) Ltd. with whom the G.E.C. has close relations in this class of work.

The first plant will be situated at the Landau Colliery of the South African Coal Estates (Witbank) Ltd. and will clean 6 in. x ¼ in. raw coal at the rate of 350 s.tons per hour. The second, for Natal Navigation Collieries and Estate Co. Ltd., will be built at their Kilbarchan Colliery and will handle 6 in. x ¼ in. coal at the rate of 320 s.tons per hour. The clean coal from the latter plant will be employed entirely for steam raising in power stations, but the Landau plant will produce up-graded sized coal for the domestic market.

Most of the equipment associated with the Chance cleaning sections will be manufactured in South Africa to the designs of the Erith Engineering Works of G.E.C. but some will be made at Erith. The British General Electric Co. (Pty.) Ltd. will be responsible for the coordination of the work with Robins Conveyors (S.A) Ltd. and for the building and civil engineering work associated with the cleaning sections of both plants.

MARKETING X-RAY EQUIPMENT

Pantak Ltd., of Vale Road, Windsor, Berks., have recently concluded an agreement with Usines Balteau of Liege for the marketing in the U.K. of two ranges of lightweight portable industrial X-ray equipment. This equipment will complement their existing mobile units and will consist of two oil insulated units of 140 and 200 kV. capacity and three gas insulated units of 150, 180, and 300 kV. capacity, the 180 kV. unit being specially developed for the examination of circumferential welds and the like.

GAS TURBINE HAULS OPEN PIT ORE

The International Nickel Co. of Canada, Ltd., has taken delivery of a regenerative gas turbine engine to be installed in a truck for hauling ore at the company's open pit mine in the Sudbury District of Ontario. This is the first occasion that a gas turbine engine has been subjected to the severe requirements of ore hauling.

The GMT-305 Whirlfire, manufactured by the Allison Division of General Motors Corp., United States, produces 225 h.p. It is a multi-fuel engine with more than double the power of a comparable piston engine per unit volume and it produces approximately 70 per cent more power per lb. The open pit mine should provide an ideal testing ground for this new engine. The turbine-powered truck will have to travel almost two miles over a winding road at a gradient of approximately 1 in 12 towing a load of 32 tons of ore.

The engine is also ideally suited to the climate in the Sudbury District, where the temperature is often sub-zero. The GMT-305 has been started, after extended cold soaking, at −45 deg. F. in about 30 secs., also it can be started at temperatures as low as −65 deg. F. Its negligible oil consumption and multi-fuel capabilities make it extremely economical to operate. A definite asset is the fact that optimum fuel economy is realized at full power.

The Allison gas turbine engine shown alongside the ore haulage truck in which it will be installed. The truck, operating in Inco's Sudbury open pit mine during engine tests, will carry 32 tons of ore

The Holman Silver Three double extension autostoper

HIGH-SPEED EXCAVATOR

A new excavator for opencast ore mining, which is now being produced at the Izhora Works, near Leningrad, U.S.S.R., will load eighteen 50-ton trucks in an hour so it is claimed. Mounted on rails, the excavator can transfer rock for a distance of up to some 38 yds., using a bucket of 10½ cu. yd. capacity which can be filled and emptied in 30 secs.

Made throughout of frost-resistant steel, and controlled from an all-welded, air-conditioned cabin, this Izhora Excavator can be used in the hardest Arctic conditions, and the first models are, in fact, being used at nickel mines in the northernmost parts of the U.S.S.R.

EXTENSION AUTOSTOPERS

Important additions to the wide range of rock drills and compressed air operated mining equipment manufactured by Holman Brothers Ltd., are announced. They are the Silver Three Autostoper and Silver Three Double Extension Autostoper, both machines embodying all the characteristics of the Silver Three handril.

The compact Silver Three Autostoper has been developed from the standard Silver Three Handril, and is integrally mounted to the piston of the feed cylinder and a feed length of 31 in. (787 mm.) is provided. The robust construction of this machine, its powerful rotation and simplicity of control, together with its high rate of blows, gives it particular advantage in meeting demand for increased footage. The feed cylinder

The Holman Silver Three single extension autostoper

bore is 2½ in. (64 mm.) and the length of the autostoper is 61½ in. (1,562 mm.) when closed. It weighs 86 lb. (39 Kgs.) with a collared steel chuck.

The Silver Three Double Extension Autostoper was originally developed to suit specific drilling requirements in Australia where local conditions required the use of a stoper which would provide maximum feed with the shortest possible closed length. The new double extension Autostoper successfully combines these two essential qualities and it has already acquired great popularity in Australia, notably at the Mount Isa mines and at Broken Hill.

Its closed length is only 51 in. (1,295 mm.) which enables the operator to work in tight corners and to angle the Autostoper much more than can be done with a single extension machine. It is ideal for working in confined headroom and is well suited to the modern trend of raising in preference to sinking. A feed length of 40 in (1,016 mm.) is provided which allows a considerable reduction in the number of steels used.

The feed is controlled within very fine limits by means of a sensitive twist grip throttle. The double extension Autostoper has 2 1/16 in. and 2¾ in (56 and 70 mm.) feed cylinder bores. The length of the stoper is 91 in. (2,311 mm.) when fully extended. It weighs 98 lb. (44.4 Kgs.) with a collared steel chuck.

HYDRAULIC BACKFILL

Preston East Dome's hydraulic backfill plant and underground conduit system is described in *The Rio Recorder*.

Preston, the Rio Tinto Group's veteran gold producer in the Porcupine district of Northern Ontario, has undertaken a hydraulic fill installation for several reasons.

The mine's waste dump, which has served well for many years, has been largely depleted. Gravel would prove too expensive to replace waste as backfill material in the mined-out stopes. In addition to this, increased distances to orebodies at the Preston mine have increased haulage costs. Hauling fill with light equipment now in use would prove impractical.

A third reason for Preston's "changeover" to the hydraulic fill method is because the mine is operating fewer stopes. Reduction of filling time would then tend to speed up production.

Hydraulic backfill is produced from mill tailings. As the tails come from the mill they contain about 50 per cent slimes. Hydraulic classifiers remove the slimes from the tailings.

As the mill tailings are pumped in at the top of the cyclones under pressure, centrifugal force causes the slime to separate and overflow at the top. The coarse sand portion is thrown out to the sides and falls to the bottom where it is discharged. The coarse sand is used for filling the stopes underground.

Due to Preston's limited water supply (large quantities are required to operate a backfill plant), one of the mill thickeners is being cut out of the circuit to reclaim water from the slimes before they are pumped out to the tailings area.

The sand portion which comes out of the bottom of the cyclones is transported to a mill storage bin which has been converted to become a fill bin.

The fill itself will be transported underground from this storage bin through a drill hole to the second level.

About 250 tons per day of backfill will be available for the mine.

SCREENS FOR EUROPEAN MANUFACTURE

Overstrom screens, among the most successful vibrating screens produced in the United States, are to be manufactured under licence for the first time by Armstrong Whitworth (Metal Industries) Ltd. of Gateshead. The British firm has the rights for manufacture and sales throughout the world, with the exception of the Americas and New Zealand.

The screens, which are suitable for installation in mines and quarries, are for wet or dry, light, medium and heavy service. There are seven sizes ranging from 3 ft. x 18 in. to 16 ft. x 6 ft. and each can be equipped with one, two or three decks. All screens can be fitted with partial or complete dustproof enclosures, water spray equipment, and heating units which are sometimes required for the finer mesh decks dealing with damp, sticky materials.

The first British-made screen is now being installed at Kirkwhelpington, working in conjunction with a large Kue-Ken crusher also manufactured by Armstrong Whitworth. This screen is an 8 ft. x 4 ft. single deck assembly with a 2½ in-sq. mesh which will be screening quartz-dolerite.

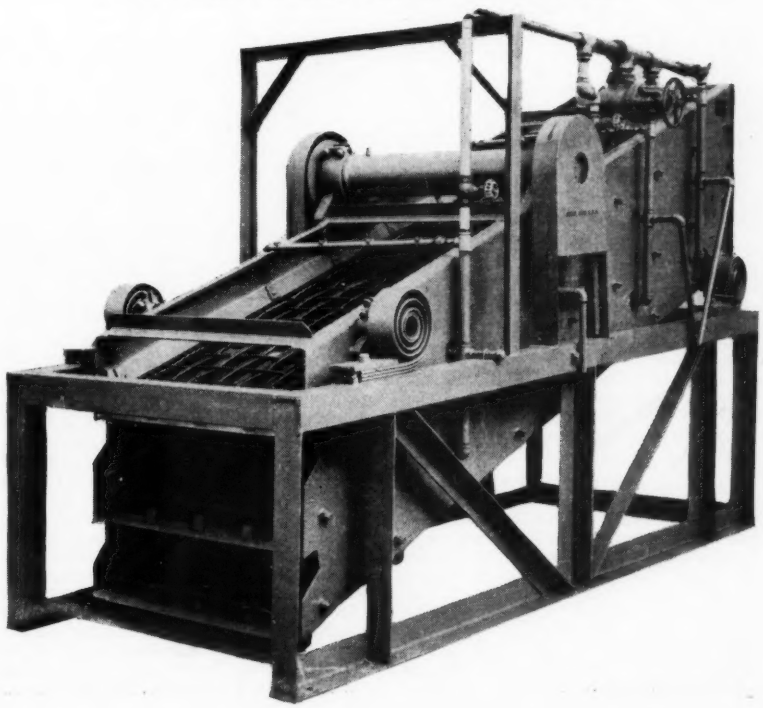
SLEEVE PACKING FOR DRILL STEEL

It is reported that extensive tests have proved that a sleeve packing recently developed for Sandvik Coromant extention drill steel equipment is the most effective seal in the shank end of adapters, drill rods and the like. The new packing will be introduced gradually as the old standard items run out of stock.

The packing is inserted by fastening the shank adapter in a vice with the packing softened somewhat by the warmth of the hand. The packing is then inserted by the use of pliers, and is said to be easily removable after it is worn out by means of a knife.

The packing is made from Hydrofit, and is claimed to have a life several times that of the O-rings which were only used as shank packing. It is not imagined that this sleeve packing will add to the life of the shank adapters, but the manufacturers feel that some advantage accrues to the operator who has a shank adapter with a tight packing that does not need frequent changing. The result is high penetration, reliable drilling and no inconvenient water spray over the driller.

Armstrong Whitworth Overstrom 3 in. by 12 in. triple deck vibrating screen fitted with water spray equipment on all three decks



Metals and Minerals

Magnesium Price Concessions

United States users of magnesium are being offered price concessions under specified conditions as part of a drive by producers to capture a larger share of the present and future metal markets. Under a still largely experimental programme, the Dow Chemical Co. has offered the automotive industry and other castings customers a pricing formula which, in effect, would match aluminium prices with a protective clause running through August ,1963. The major target is obviously the fast-growing automotive industry. As an added inducement, a development allowance would be granted to offset the cost of modifying, changing or installing new equipment necessary for a changeover.

The formula for computing the price of the magnesium is based on smelters' aluminium alloy castings ingot, No. 380 low zinc (computed at 1.4 times the selling price). It is further provided that at no time shall the magnesium price exceed 1.28 times that of primary pig aluminium. According to trade sources, magnesium is competitive in price with aluminium generally when its price is no more than 1.3 times that of aluminium.

The total new supply of magnesium in the U.S. last year is estimated at around 41,000 s.tons. Commercial production of primary magnesium ingot was at least 30,000 tons, according to preliminary figures issued by the Bureau of Mines, while preliminary reports indicated a probable recovery of 10,000 tons of secondary magnesium from scrap. Consumption of primary metal is estimated to have risen by approximately 28 per cent in 1959 over 1958, pointing to a probable figure of 45,000 tons. Producer and consumer stocks declined to about 60 per cent of the level at the beginning of the year.

According to the Aluminium and Magnesium Division, Business and Defence Services Administration, in its Review of 1959 and Outlook for 1960, magnesium consumption for the U.S. is expected to be about 10 - 15 per cent higher this year than in 1959. It is probable that less magnesium may be used in building military aircraft, mainly because of the stretch-out in this part of the defence programme, but other defence uses and commercial applications are expected to take more. Continued use of magnesium alloyed with newer metals such as thorium is indicated in the various missile programmes. Increases are foreseen in usage by foundries and mills, as well as for alloying other metals. An increase in die casting activity is also anticipated, particularly in the automotive and tool industries.

Preliminary figures of world production in 1959 show little change, reports the U.S. Bureau of Mines. The total output is estimated at 102,000 s.tons, with three countries producing 77 per cent of the total. On the basis of estimated Soviet output, Russia was the largest producer with 45,000 s.tons, followed by the U.S. (over 30,000 tons), Norway (an estimated 10,250 tons) and Canada and Italy with probable outputs of 5,800 and 4,600 tons respectively.

FRANCE'S NEW ALUMINIUM PLANT

Péchiney's new plant, claimed to be the most automated aluminium plant in the world, started commercial production this month. Situated at Noguères, near Europe's largest natural gas desposit at Lacq, it will operate at an annual rate of 56,000 tonnes as from July, when the potline will be completed. Thanks to the new processes adopted, power consumption per tonne of aluminium has been lowered from 20,000 kWh. to 15,500 kWh. It only took 4½ hours to produce a tonne of aluminium in this plant, as compared with eight hours in the company's main plant of Saint-Jean-De-Maurienne. A considerable reduction in labour has resulted from the automation of all equipment used in the plant.

A second plant, Ugine's Lannemezan plant, will produce a further 24,000 tonnes of aluminium, so that France's output will rise from 212,000 tonnes in 1959 (including the French share of the Alucam production in Cameroons) to 292,000 tonnes. This output is expected to meet steadily rising domestic consumption and leave a fair tonnage for export deals. Domestic consumption is expected to reach 200,000 tonnes in 1961 and 220,000/230,000 by 1964.

France exported 51,610 tons of aluminium (primary and secondary) in 1959, compared with 40,294 tons in 1958. In addition, 25,000-26,000 tonnes of Cameroons aluminium were exported outside the French zone.

★

The Ministerial Council of the European Economic Community have approved a joint external import tariff to surround the six-nation Common Market. Although the question of aluminium has still to be discussed at talks in Rome, the Ministers have agreed in principle that a 10 per cent import duty would be applied to imports from outside the Community, in combination with quotas of freely imported quantities.

★

Aluminium Ltd. has agreed with Alcoa to cancel delivery of approximately 59,000 tons of aluminium contracted for delivery in 1960 and 1961, against payment by Alcoa in 1960 of a fee of approximately $9,000,000. This represents some 10 per cent of the 600,000 tons originally contracted for by Alcoa in 1953. No reason for the cancellation has been given.

Aluminium Ltd. has stated that, in view of current prospects, its announced 1960 production schedule of 675,000 tons at its Canadian smelters will remain unchanged.

★

Details of a "hot metal" aluminium contract, involving direct delivery of molten metal from a producing furnace to a consuming foundry, have been worked out by Alcoa and the General Motors Corporation. It has been reported that General Motors will begin taking hot metal from Alcoa's new Warrick plant in Evansville, Indiana, in July. The metal will be carried in special ladle lorries some 105 miles to the General Motors foundry at Bedford, Indiana. Travel time will be about 4½ hours—less than half the time aluminum can be held in a molten stage. It is believed that about 25,000 tons of hot metal are involved during the first year of the pact. This will be Alcoa's first hot metal contract. General Motors and Ford also have hot metal contracts with Reynolds Metals, but in both cases the metal plants are close to the motor car plants. The new molten metal contract is regarded as strengthening aluminium's position in the automotive market.

U.S. URANIUM PRODUCTION

U.S. domestic uranium production in 1959 rose by 30 per cent over 1958 to a total of 6,900,000 dry tons, making the U.S. the Free World's largest producer, reports the A.E.C., which however, did not amplify its claim for Free World leadership by comparative figures from other countries. In its annual report to Congress, the A.E.C. said that, despite this increase in production, U.S. uranium ore reserves rose by 3,500,000 tons in 1959 and stood at 86,000,000 at the end of the year.

It was, of course, the increase in domestic reserves and production which prompted the agency last year to undertake a "stretch-out" of its contracted uranium purchases. Some ore contracts specifying delivery from Canada in the next three years were deferred to the 1962-1966 period. Similar deferments are being made with domestic producers.

The commission is continuing to negotiate with companies interested in building uranium mills in south-east Texas, under its programme to provide for markets for areas where uranium has been discovered. Similar attempts to get mills for Nevada and the Dakotas have so far failed.

RUSSIAN CHROME EXPORTS

Last month certain leading Japanese ferro-chrome producers who recently imported Soviet chrome ore were reported to be showing buying interest in further Soviet supplies. Now Showa Denko have contracted to import a total of 20,000 tons of chrome ore from the Soviet Union, the price to be fixed at $U.S.34 per ton, ci.f. Japan, for ore of 48 per cent Cr content. Shipments are to start this month. This is the largest import contract to date for Russian chrome ore.

Reports that Japan had agreed to purchase 20,000 tons of chrome ore from the U.S.S.R. are worrying Philippine chorme producers states an article in the *Manila Bulletin*. The article points out that Philippine chrome exorts have become less competitive in world markets due to increased local taxes and a 25 per cent marginal fee on foreign exchange. Since Russia can outsell the Philippines inthe foreign markets, it is feared that she might also supplant them in the Japanese market.

NICKEL'S ENCOURAGING OUTLOOK

World use of nickel is rising at an average rate of 12,500 s.tons a year, stated Mr Horace Fraser, president of Falconbridge Nickel Mines Ltd., in an address to the New York Society of Security Analysts. As steel production rises and capacity increases nickel consumption is likely to go up, especially because stainless steel accounts for about 30 per cent of nickel consumption. Asked about the possibility of a price increase for nickel, Mr. Fraser said that he looked for no price change in the immediate future, but in the event of any further wage increases the price would have to be raised.

Falconbridge produced a record amount of nickel in 1959. Output reached 29,500 s.tons, being an advance of 5,250 s.tons. Mr. Fraser stated that, with its new smelter equipment and expanded mine workings, the company could probably turn out 32,500 s.tons of nickel a year.

UPGRADING OF MOLYBDENITE

The General Services Administration has asked for proposals from U.S. industry by April 1 next to upgrade molybdenite by its conversion to molybdic oxide. The new conversion would be in addition to the conversion of some molybdenite now being undertaken to upgrade materials held in the U.S. national stockpile of strategic materials.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Markets during the past week have presented a variegated pattern and it is hard to say whether there is now any definite trend in metal prices or whether a period in time has been reached when the prices of the four metals will fluctuate independently of each other before establishing some new common trend.

OUTLOOK FOR COPPER PRICES

With the settlement between Anaconda and the Mine Mill Union, the strike situation in the U.S. is now resolved with the exception of the dispute between Phelps Dodge and the Steelworkers' Union at the Laurel Hill plant and, in addition, the same company is in dispute with the Railroad Brotherhood in Arizona which is hindering output. The position in the U.S. now is that producers are selling at 33 c. per lb., customs smelter at 35 c. per lb., whilst prompt copper in dealers' hands is still commanding a premium of about 2 c. per lb. but with dealings in this last category few and far between. Although it is expected that some 6-8 weeks will elapse before full production from refineries becomes available, fabricators appear confident that they will be able to wait for this time, as not only are their stocks still reasonable but new business is not as bright as many had hoped. There is no doubt, however, that during the next few weeks there will be some companies who will be forced to pay premiums for their requirements.

In Europe, owing to the backwardation which has existed on the L.M.E., the premium for wirebars has largely disappeared but supplies are extremely scarce and it would not be surprising to see a premium redeveloping if the present downward tendency of the market continues. The main feature on the Exchange has been the contraction in the backwardation in spite of a further decrease in official stocks at the beginning of the week of 350 tons, bringing the total down to the very low level of 3,472 tons, and most people expect that a further period of tightness will be experienced before a more normal relationship between cash and forward is re-established.

One of the more unexpected features of both the L.M.E. and Comex has been the strength of the forward quotations and this seems to indicate that in general opinion inclines to the view that the copper shortage will not be overcome, as far as the markets are concerned, before the end of the second quarter. One theory advanced, as far as the London market is concerned, is that as Europe has become denuded of copper stocks it is essential for there to be a period when the sterling price will be above the dollar price to the extent of attracting copper to Europe rather than to the U.S. and as it is generally agreed that copper interests in the U.S. will try to maintain a price level in excess of 30 c. per lb., then the present levels in London for forward copper are still a little low.

There is no doubt that the geographical build up of stocks is going to cause some dislocation to what has become accepted as the normal price structure of copper in the world. The commercial division of the Chilean Department of Copper has reported that during 1959 total production in Chile amounted to 545,864 tonnes, an extremely good total in view of the month's strike at one of the big producers in the autumn. The Copper Institute's figures for January showed that production of refined copper in the U.S. amounted to 86,491 tons as compared with only 46,303 tons in December, and this gives some measure of the various strike settlements during January. Deliveries totalled 104,678 tons against 90,039 tons in December and stocks of refined copper in producers' hands at the end of January rose slightly to 66,850 tons against 64,763 tons at the end of 1959.

Outside the U.S., production was 155,457 tons compared with 157,312 tons in December, whilst deliveries amounted to 160,772 tons against 148,056 tons in the previous month. The end of year stocks showed a slight decrease at 215,719 tons as compared with 22,843 tons at the end of 1959. These figures were variously interpreted: the majority seem to feel that the falling tendency of stocks in world producers' hands had been arrested and that from now on a build up will commence.

TIN REMAINS FIRM

The tin market has been exceptionally uninteresting with prices rising slightly and demand remaining at a reasonable level. Stocks in official warehouses fell 175 tons at the beginning of the week to a total of 8,302 tons and on Thursday the Eastern price was equivalent to £804 per ton c.i.f. Europe.

LEAD-ZINC CONTANGOS MAINTAINED

Both the lead and zinc markets have developed an easier undertone and recently established contangos have been maintained. Consumption of both metals remains good and as available stocks in the U.K. are not large, a reversal of the tendency would not be unexpected. During the week it was announced by the Japanese that foreign exchange had been allotted for an emergency import of 26,000 tons of zinc concentrates and 3,000 tons of lead ingots of scrap to relieve a shortage which had developed on the domestic market. In Australia the mining companies in Broken Hill announced that a return to full-time operations was being made after a year of curtailment but it was pointed out that as sales of lead were still restricted by voluntary agreement amongst the producers, some lead and lead concentrates would have to be stockpiled.

In the U.S. the Bureau of Mines announced that production of lead in December at 19,856 s.tons was slightly below the November figures and gave a production for the whole of 1959 of 253,000 s.tons which was the lowest domestic mine output since the turn of the century. When reading this figure it should be remembered that the quota system has been in operation over the whole period. As regards the quota system, the Secretary of the Interior forecast that import quotas would be extended beyond 1960 but subsequently he was taken to task by a commercial spokesman who pointed out that the Tariff Commission were at present sitting and that its recommendations were not due to be submitted to the Senate until March 31 and that during the hearings opposition to quotas by representation of about one-half of the production of lead and zinc in the U.S. had been voiced.

Closing prices are as follows:

	Feb. 11		Feb. 18	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£269	£270	£269	£269½
Three months ..	£245½	£246	£249½	£249½
Settlement ..	£270		£269½	
Week's turnover	10,350 tons		9,450 tons	
LEAD				
Current ½ month	£71½	£72	£74⅜	£74⅝
Three months ..	£72¼	£72⅜	£74⅜	£74½
Week's turnover	5,900 tons		8,200 tons	
TIN				
Cash	£792½	£793	£793½	£794½
Three months ..	£790	£790½	£793½	£794½
Settlement ..	£793		£794½	
Week's turnover	530 tons		825 tons	
ZINC				
Current ½ month	£89½	£89⅞	£86⅞	£87
Three months ..	£89⅞	£90	£87½	£87½
week's turnover	3,375 tons		6,475 tons	

Mining Finance

Shake-Up at Blind River

Since the terms of the Canadian Government's stretch-out proposals for uranium producers were made known a few month's ago, the market has been on tenterhooks awaiting the individual reorganisation plans. A number of contract sales have taken place, but the news most anxiously awaited has been that concerning the Blind River producers of the Rio Tinto group—Pronto, Algom, Miliken Lake, and Northspan.

These plans have now been announced. Briefly, the reorganization consists of the formation of a new company, Rio Algom, which will take over the entire businesses of the four producing companies. Subject to shareholders' approval, Rio Algom will issue its n.p.v. shares in exchange for those of the producers in the following proportions : 165 for every 100 Algom ; 35 for every 100 Pronto ; 14 for every 100 Milliken Lake, and 13 for every 100 Northspan. This would absorb 12,000,000 shares, of which 7,168,915 would be attributable to Algom shareholders, and the remaining 2,800,000 odd to Pronto, Milliken and Northspan in more or less equal proportions. A net beneficial interest amounting to 37.57 of this capital would be in the hands of Rio Tinto Mining Company of Canada, which is a 54 per cent owned subsidiary of Rio Tinto of London.

If the amalgamation goes through, it is intended to shut down all the properties with the exception of Algom Quirke and Algom Nordic, which, as the lowest-cost producers, will fulfil the "stretched" contract by working at near capacity till 1965-66. The Pronto mill will be converted to treat the copper ore from the recently acquired Pater property near-by.

Dividends from Rio Algom will be precluded for the time being by certain conditions attaching to the indebtedness which it will take over from Northspan. In any case, the sheer weight of loans and debentures, coupled with the fact that demand for uranium in the 1966-70 period is still an unknown quantity, must mean that a highly prudent dividend policy will be adopted by the company, even when distributions are theoretically possible.

Bearing in mind the considerable number of variables—costs, ore reserves, market prices, taxation are just a few—of which account had to be taken, it is almost impossible to comment on the equity of the arrangement.

In particular, the balance between the dividend earning Algom and Pronto shares and those of Milliken Lake and Northspan almost defies analysis. All that can be said is that a shareholder in the new company will certainly hold a more soundly based investment than did a holder of the shares of any of the individual producers.

GHANAIAN DIRECTOR FOR G.M.R.

A significant break with tradition has been made by Ghana Main Reef. Mr. C. W. Tachie-Menson, a Ghanaian with a most distinguished record in public service, private industry and labour relations, is to be put forward as a director of the company. As Mr. Tachie-Menson is 70 years of age, his appointment will be subject to the approval of shareholders in general meeting.

It is widely known, of course, that Mr. C. J. Burns, chairman of Ghana Main Reef, has for some time been considering ways and means of cementing the already close relationship between the Western Selection group and the Ghana government. Obviously a director resident in Ghana would be a great asset to the company. If, like Mr. Tachie-Menson, the director is a Ghanaian citizen, so much the better, and G.M.R. can feel most fortunate in being able to lay claim to the services of such a distinguished African. It is possible that Mr. Tachie-Menson will, in due course, be invited to join the boards of other companies in the Western Selection group.

Ghana Main Reef itself has had a successful year, from both the technical and financial points of view. The taxed profit for 1958-9 it is true, was only marginally higher at £53,828, but included in the previous year's figure was a Ghana government grant of £12,600. Dividends totalled 6d., including a bonus of 1½d., against 4½d. in 1957-8. An interim of 4½d. for 1959-60 has already been declared.

On the technical side, an event of major importance was the installation of a single-drum hoist capable of hoisting waste through the sinking compartment of the Tuappim Internal Shaft. Even more important is the decision to develop the known ore shoots in depth as well as laterally. In the past, it has always been considered that the most important addition to ore reserves would come from lateral development, but recent work has convinced the company of the necessity of an exploration programme in depth to test the fissured areas between and beyond the known shoots.

Taken together, these two developments could be of the utmost importance for G.M.R.'s future. The development programme in depth has already given promising results, and should the promise be fulfilled there is every prospect of an improvement in mill grade once the richer ore is being hoisted from the deep levels of the Tuappim section.

MORE O.F.S. BOREHOLES

Last week saw the publication of three new reef intersections in the O.F.S. On the Western Holdings property, borehole MH3 intersected the Basal Reef at a depth of 3,060 feet. The value of the intersection was 542 in.-dwt.

Borehole MH3, situated 6,800 feet north-west of No. 3 shaft was drilled primarily to locate the depth of the Basal Reef in this area, and no further deflections will be made. This being so, little can be said about the result except that it does at least indicate that the reef continues to give good values outside the limits of the highly enriched area to the northwest.

The other results published last week come from the new No. 3 shaft system in the north-eastern part of the President Brand lease area. The system consists of a main shaft and a ventilation shaft, and there were, therefore, two intersections. Both were comparatively disappointing for this

LONDON MARKET HIGHLIGHTS

The latest break on Wall Street brought depression to practically all sections of the London Stock Exchange last week. As far as South African gold shares were concerned dullness on Monday and Tuesday, which was occasioned more by a Johannesburg market reluctant to take stock than by any weight of selling, developed into widespread weakness on Wednesday.

Selling seemed to come mainly from the Continent which was particularly nervous of Wall Street's behaviour. Not much stock was offered from America. But there was an underlying fear that if the slide on Wall Street continued it might bring in some selling of the recent fairly heavy purchases of gold shares made by U.S. investors.

This theory was reasonable up to a point only. It is true that when a wave of depression hits a financial centre all share prices lose ground, whether the companies concerned are affected or not by the cause of the depression. But in every case stock markets have a way of redressing the balance of things fairly quickly. And if shares have been unjustly depressed, they will usually recover even if the rest of stock markets continue to fall.

For this reason, holders of good-class gold investments should not be panicked out of them at the present time. After all, it should be remembered that U.S. buyers of gold shares in recent times have been prompted to enter the Kaffir market because they feared for the security of the dollar and anticipated a setback on Wall Street: the very factors that are at work at the moment.

All share prices were marked down sharply on Wednesday. Free State Geduld became particularly weak with a fall of 10s. to 163s. 9d., while Western Holdings dropped 8s. 9d. to 163s. 9d. "Ofsits" came back 3s. 9d. to 98s. 9d. and Western Deep 3s. to 52s. 9d. Particularly depressed in the Finance group were Rand Selection at 66s.; in the previous week the shares had touched 75s. on vague take-over rumours, but the subsequent appearance of an otherwise very satisfactory annual report contained nothing to confirm the earlier rumours. Among diamonds, De Beers fell 5s. to 189s. 4½d.

As might have been expected, coppers also suffered in the wake of Wall Street. Continental sales depressed most of the leading issues, among which Rhokana fell 2s. 6d. to 64s. 4½d. and Bancroft 1s. 6d. to 24s. 9d. Despite an encouraging annual report with confirmation of the mine's low production cost ability, M.T.D. (Mangula) succumbed to Cape sales and lost 6d. to 11s. 10½d. Even "Tanks," which previously had risen to 44s. 9d. at one time in sympathy with the Brussels strength of their holding in Union Miniere, later fell back to 42s. 6d.

One of the very few sections to escape the cold draught was the Tin group. U.S. interest being practically non-existent in this market section, Wall Street's malaise made little difference. More important was the remarkably firm metal price and the good earnings prospects of the companies this year, a view underlined by the latest doubled interim dividend of Rantau.

Elsewhere, Rio Tinto were unsettled at 41s. 6d. by uncertainty caused by their Canadian uranium merger scheme and Lead-zincs wilted with the other markets.

rich company. In the Main shaft, faulting limited the reef exposure to about fifty per cent of the circumference. Sampling showed values of 314 in.-dwt. and 6.20 in.-lb. In the ventilation shaft a full exposure was obtained, with values averaging 369 in.-dwt. and 7.84 in.-lb.

MANGULA'S COSTS

Ever since the mine began production, costs at M.T.D. (Mangula) have defied outside analysis. In this year's annual report, however, this S. Rhodesian copper producer has clarified the position. Operating costs per ton of concentrate in the year to September last worked out at £56.8. The company translates this as being equal to some £124 per ton of copper. Realisation charges add almost £42 to this—£19 per ton of 51.18 per cent cu. concentrate "grossed up". Thus the total cost was of the order of £166 per ton of copper.

It is important to remember that Mangula's plant was not completed until the first quarter of 1959, so that it was only possible for the mine to work at full efficiency during the second half of the financial year. Again, costs are currently inflated by the fact that Mangula's output is refined overseas. In about six months' time, Mangula will be able to send its ore to the new smelter and refiner at Alaska, so that reductions in this cost level, satisfactory as it is, can confidently be expected both in the current financial year and in 1960-1. Indeed it has been officially stated that costs in the current year should not exceed 22s. per ton of ore treated, compared with 25s. 3d. last year.

Bearing this in mind, the year's net profit of £394,224 is both satisfactory in itself and promising for the future. At their present level of around 12s. 3d. the shares are hardly overpriced. The same comment applies to the shares of the parent company, Messina Transvaal Development, whose widespread interests and go-ahead management are hardly reflected in the yield of 6 per cent.

NEW SHAFT AT ARISTON

Ariston Gold Mines is to sink a new small shaft about 2,000 feet north of the North shaft. To be known as the Ankobra shaft, the new shaft will facilitate exploration of an area lying between the upper limits of the northern ore-body and the surface.

This is one of the areas referred to as "a bonus", by Mr. C. J. Burns in his chairman's review last year. The deep-level ore-bodies are the mainstay of the mine, and Ariston's energies must be directed towards development below the 24th level. There are, however, several relatively small areas of high promise which should provide useful additions to profits over the next two to three years.

MODDER B'S MINE VILLAGE

Apart from its freehold, the last remaining asset of Modder B Gold Mines, erstwhile "jewelbox of the eastern Rand", is its mine village. Plans for its disposal have been under consideration for some time, but definite proposals have been precluded because no indication has yet been given as to which racial group is to be allowed to occupy the area in which the village is situated. In addition, the buildings are old, and would require considerable expense to bring them up to the necessary standards, while the sale of the buildings piecemeal would entail the granting of easy terms over a long period.

Fortunately, the Union government has now solved the problem by making an offer to lease the buildings on behalf of its Prisons department. The lease will run for two years with an option for a further year at an annual rental of £5,700. The really important point, however, is that the government will have the option to purchase the village during the currency of the lease for the sum of £95,000. It seems likely that this option will be exercised. The transaction is, of course, subject to shareholders' consent, and a meeting for this purpose will be held on Feb. 22 in Johannesburg.

RAND SELECTION NEEDS CASH

The outstanding feature of Rand Selection's report for 1958-9 is the increase in the market value of the portfolio. From £12,573,000 at September 30, 1958, the value had risen to over £17,569,027 twelve months later. Nor was this the result of extensive market operations; the rise in book value was barely 2 per cent, compared with the 49 per cent increase in market valuation.

The taxed profit, too, showed a good improvement over the previous year, rising from £1,332,351 to £1,559,335. This was almost entirely attributable to two factors: a rise in the income of South African Townships, Rand Selection's subsidiary, which is predominantly interested in the O.F.S. gold field; and a sharp increase in sharedealing profits, which totalled £213,995 against £99,917. The dividend rate was increased by 3d. to 2s. 9d.

In spite of these good results, it looks as if Rand Selection will soon be coming to the market for new capital. The liquid position has improved, but it is still on the low side, bearing in mind the company's participation rights in new Anglo American business. In addition, Rand Selection has outstanding £1,000 000 of 4½ per cent loan stock which falls due for redemption in seven months' time. If the 500,000 reserve share were to be issued by way of rights, however, the proceeds should be amply sufficient both to repay the loan stock and to replenish the assets. The addition to the equity would be less than 7 per cent, so that servicing the new capital would provide little difficulty. Indeed, the cessation of the £45,000 per annum now being paid in interest charges would go more than halfway towards paying the present rate of dividend on the additional shares.

Statement on page 220.

Continued on page 220

JANTAR NIGERIA COMPANY

The forty-seventh annual general meeting of The Jantar Nigeria Company Limited was held on February 16 at Winchester House, London, E.C.

Mr. C. A. P. Tarbutt, Chairman and Managing Director, presided.

The Chairman said :—

Output : The production of Tin was restricted throughout the year under the International Tin Agreement and the output amounted to 147.54 tons against 237 tons last year when restriction only operated for approximately nine months of the year.

Columbite production was 232 tons as compared with 194.5 tons last year.

Columbite : The demand for Columbite, particularly for the grade of ore which your Company produces, has increased during the year, and slowly rising prices for the year's output have been obtained.

Contracts have been entered into for the whole of the output for the year 1959/60 at prices to be negotiated quarterly.

On the assumption that the future demand for Columbite will at least be maintained and may increase, it has been decided to start working our primary deposit on an experimental basis.

Meanwhile, check drilling has been carried out in order that the Primary Ore Reserves may be assessed. When the results are available stockholders will be informed.

Basalt Lead : No work has been done on the Basalt Lead during the year. It must be borne in mind that there are some 2,000 tons of Tin indicated still to be won from the Basalt Lead in addition to the amount shown in the Manager's Report.

When Tin Restriction ends another attempt must be made to work this deposit economically at a high production rate, which is clearly impossible so long as Tin Restriction remains in force.

Ore Reserves : For some time past your Directors have considered that the Ore Reserves as shown annually in the Directors' and Manager's Reports have not been on a sufficiently accurate basis.

During the year considerable work has been done by the Manager in order to establish up-to-date ore reserves figures. As a result, it is believed that the figures of reserves shown in the Directors' and Manager's Reports are more accurate than those given in the past.

The ore reserves as re-calculated are :—

Tin	1,404 tons
Columbite	1,796 tons

as compared with the figures shown in last year's Directors' Report of :—

Tin	1,176 tons
Columbite	1,052 tons

General : Your Directors consider that it is necessary to continue to conserve the cash resources of the Company having regard to the fact that some capital expenditure will be involved in opening up production from the Primary Columbite and that in the future further capital expenditure must be incurred when the Deep Lead is re-opened.

Net profit for the year ended September 30, 1959, after taxation amounts to £21,681. Adding to this the amount brought forward from last year of £15,383, and an amount of £4,500 written back, being provision for taxation no longer required, the distributable balance standing at the credit of the Profit & Loss Account is £41,564.

Your Directors recommend the payment of a dividend of 4½d per share (15%), less Income Tax at 7/9 in the £, which will absorb £20,672 leaving the sum of £20,892 to be carried forward.

Mr. Jonathan Janson has been appointed to the Board to fill the vacancy caused by the death of Mr. A. C. Tarbutt.

I am sure that you would wish me on your behalf to thank the Manager and his staff, both European and African, for what they have achieved during the past year. I think we are very fortunate to have such an excellent team.

The Report and Accounts were Adopted.

Publications Received

Industrial Minerals and Rocks. Third Edition. Published by the American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., 29 West Thirty-Ninth St., New York 18, N.Y. pp. 946. Price $12.

The first edition of this well-known publication was printed in 1937, the second in 1949. This new edition has been almost entirely rewritten in an attempt to keep pace with the rapid changes that have occurred in the technology, industrial applications and usefulness of the industrial minerals. Like its predecessor, its publication has been made possible by an appropriation from the Seeley W. Mudd Memorial Fund.

Concise and authoritative, the present volume represents the collective achievements of the Industrial Minerals Division of the Society of Mining Engineers of A.I.M.E. and has many distinguished contributors. It contains nearly sixty chapters, each dealing with a specific mineral or group of minerals and covering such aspects as properties, geology, exploration and evaluation, mining and milling, tests and specifications, uses and prices. Each chapter is illustrated with maps, diagrams, tables and includes a selected bibliography. This very comprehensive and well produced publication will be an invaluable reference work on the vast field which it so admirably covers. Not the least of its merits is the effort which has obviously been expended, up to the last possible moment, in keeping it fully up to date, as indicated by a number of references to events in 1959. This is a virtue by no means common to every reference work of comparable dimensions.

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Northern Natal Coal-Field (Area No. 2) *The Utrecht Area,* Bulletin 29 Geological Survey, Union of South Africa Department of Mines publication, with notes by K. H. L. Sehlke and S. W. van der Merwe. Price 6s. 3d. Pretoria.

The Utrecht area was geologically surveyed by J. J. Blignaut and F. J. J. Furter during 1937-39, and described in Coal Survey Memoir 2 of the Geological Survey, published in 1952. The Coal Commission of 1946-47 recommended that prospecting for coking coal by drilling should be carried out by the State, and controlled by the Coal Advisory Board, and that £750,000 be spent on prospecting over seven years. The area to the north of Utrecht (the Balelasberg) was one of the areas recommended by the Commission to be investigated, and drilling commenced during April, 1952, and was completed in 1958.

★

The Morapule Coalfield, Palapye Area, by O. J. van Straten. Mineral Resources Report No. 1, published by the Geological Survey Department of the Bechuanaland Protectorate, pp. 50, with folder of maps, price 5s.

Exploration of the potential coal areas of the Bechuanaland Protectorate has been carried out by the Geological Survey Department since 1948 and core drilling has been in progress in the known coalfield areas south-west of Palapye since 1950. The Morapule coalfield area lies 7½ miles west of Palapye siding on the Rhodesia railway line in the central portion of the Bamangwato Reserve. The first core borehole drilled by the Department in the Morapule coalfield area was completed in 1952. Further work was undertaken at Morapule in 1955 and in addition to geological mapping, 9 core boreholes were completed. As a result of this work, the general geological succession and structure was established and analyses of samples from the coal-bearing horizons intersected in these boreholes provided information on the quality if the coals and the thickness of the basal seam zone in the eastern portion of the Morapule basin. Better quality coals are present in the deeper portions of the basin, below 390 ft., and in an easterly direction, towards the margin of the basin, the quality of the coals tends to deteriorate and the thickness of the seams becomes variable. The area is mantled by a relatively thick succession of Recent Deposits and the shallowest depth of the sub-outcrop of the coals is 110 ft.

In 1957 it was decided that the Geological Survey Department should undertake a detailed examination of an area some 10 sq. miles in extent in the central portion of the Morapule basin and 5,128 ft. of core drilling was completed by contract methods during the last quarter of 1957 and the first quarter of 1958. This detailed programme was carried out under the direction of Mr. O. J. van Straten, who has prepared this report on the Morapule coalfield area. This report is a description of the coals occurring in the central portion of the Morapule basin and combines the information accumulated during the earlier reconnaissance programme with the new data which have resulted from the recent detailed work undertaken at Morapule by the Geological Survey Department. The report presents a table of 126 proximate analyses of samples from the coal seams intersected in 23 boreholes concentrated in an area of 12.5 sq. miles. These analyses indicate that the coals of the Morapule area can be classed as low grade bituminous steam coals relatively high in ash. In an area of 9.38 sq. miles in the central portion of the Morapule basin, down to a depth of 450 ft., the reserves of coal, with calorific values of 11 to 12 lb./lb. (average value 11.34 lb./lb.) and ash contents of 12.0 to 18.8 per cent are estimated at 150,500,000 tons.

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Northern Rhodesia Geological Survey, Occasional Paper, No. 21, comprises a paper entitled Recent Exploration in the Kandabwe Coal Area, and its bearing upon The Correlation of the Coal Measures of Northern and Southern Rhodesia. By R. Tavener-Smith, reprinted from the Transactions of the Geological Society of South Africa, Vol. lxi, 1958.

Detailed mapping in the Kandabwe area, coupled with data obtained from concurrent drilling operations, has led to a fairly complete knowledge of the lower part of the Karroo System in the locality. Glacial deposits encountered in the course of the work constitute the second discovery of the kind to be made in Northern Rhodesia of recent years, and help to refute the suggestion that the Dwyka Series is not represented in the Territory. The basal Karroo sandstone-conglomerate of the Gwembe District is equated with the Lower Wankie Sandstone of Southern Rhodesia, in view of several important characters common to both formations. Suggestions are made as to the environmental factors which led to the formation of thin coal seams of poor quality over the greater part of the mid-Zambezi valley, and of thick seams only locally at or near the base of the coal measure sequence.

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Manganiferous Iron Ore, Hematite, Barite, and Sillimanite on Gams (Portion 1), Namaqualand. Bulletin No. 28 by C. B. Coetzee, published by the Geological Survey, Dept. of Mines, South Africa, pp. 29, price 4s. 6d.

Deposits of manganiferous iron ore, hematite, barite, and sillimanite occur in Kaaien metamorphics on the farm Gams (portion 1), 30 miles west of Pofadder, in the District of Namaqualand. The bodies of iron ore and barite occur near the contact of quartzite and schist, along the slopes of a 200 ft. deep kidney-shaped basin which was formed by the erosion of the central part of the Gamsberg. The ores are not admixed, but occur as separate lenses or tabular sheets, set in juxtaposition. The manganiferous ore is exposed intermittently along the strike for a distance of 26,000 ft. About 30 ft. vertically below this ore, a barite sheet outcrops more or less continuously for 8,300 ft. Two small lenses of high-grade hematite occur on the horizon of the manganiferous ore. Two lenses of massive sillimanite are found lower down in the Kaaien metamorphics, some 7,000 ft. to the south-east of the other orebodies. The reserves of barite to a depth of a hundred ft. are estimated at 3,100,000 tons, but the remoteness of the site militates against exploitation under present conditions. The reserves in that sillimanite body which contains the better quality of material, are assessed at 2,000 tons to a depth of 10 ft.

A description of these deposits, with plates and folder map, is given in this publication.

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Coalfields West Half Cumberland County, Nova Scotia, by M. J. Copeland, Geological Survey of Canada, Memoir 298, published by the Department of Mines and Technical Surveys, Ottawa, Canada. pp. 89, with maps and folder, price 75 cents.

The detailed study of strata exposed in cliff sections along the shore of the Bay of Fundy near Joggins, Nova Scotia, was begun by Sir William Logan, founder and first Director of the Geological Survey of Canada, in 1843. Since then, step by step, other sections and other facies have been related to Logan's section, and in this report the author combines new information with that already available to present a concise picture of the stratigraphy and coal resources of the west half of the Cumberland basin.

The coalfields of Cumberland county were first worked in a small way by French settlers from Acadia; today the fields yield about 750,000 s.tons of bituminous coal a year. This report should prove most useful in helping to maintain production, for it includes detailed descriptions and analyses of the coal seams, maps showing the positions and thicknesses of the seams, and summarized data from boreholes and outcrops.

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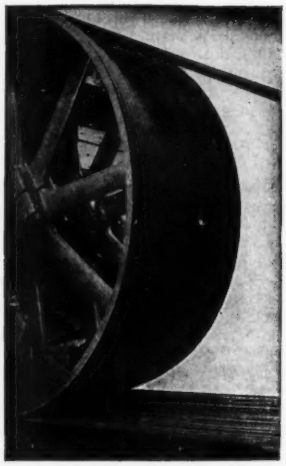

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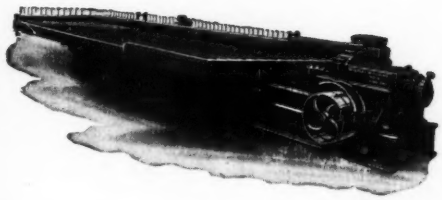

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HIGHER PROFITS AND DIVIDEND

INCREASE IN MARKET VALUE OF INVESTMENTS

The following are extracts from the review by the chairman, **Mr. A. Wilson,** which has been circulated with the annual report and accounts:

Interest in investment in South Africa has been maintained during the year and trading in South African shares on the Johannesburg and London Stock Exchanges has remained active. The improvement in the level of prices of quoted shares in which your corporation is interested, including its holding in its subsidiary, South African Townships, Mining and Finance Corporation Limited, has resulted in the very satisfactory increase of £8,026,602 in the market value of the corporation's investments, an increase of 49 per cent. over the market value at the end of the previous year. At the same time the increase in the book value of quoted investments held by the corporation amounted to only £188,471.

The net profit after taxation amounted to £1,559,335, which is £226,984 more than for the previous year. This improvement is almost entirely attributable to the substantial increase in the income received from our subsidiary and the net profit made on the realization of investments. The board therefore felt justified in declaring a higher final dividend of 1s. 9d. per share, making a total distribution of 2s. 9d. per share for the year compared with 2s. 6d. for the year ended September 30, 1958. The board also transferred £250,000 to the general reserve, which now stands at £7,000,000.

The corporation continues to participate in prospecting activities of the Anglo American Corporation Group in Central and Southern Africa, and expenditure of £174,861 incurred in this connection during the year has been written off in the appropriation account.

The corporation's 4½ per cent. 10-year unsecured loan stock is due for redemption on September 30, 1960, and your directors are at present considering means of financing the repayment of this loan stock.

Principal Interests

Your corporation's main interests are held directly or indirectly in primary products, copper, diamonds, gold and uranium, and to a less extent in industrial companies. It was mentioned last year that the liquid position of the corporation had improved substantially, but in view of the corporation's right to participate with Anglo American Corporation of South Africa, in new business, it cannot be considered entirely satisfactory.

Nevertheless, it has been possible to interest ourselves in new companies—which is so important if we are to maintain our position as a leading financial company—and to write down the book value of certain investments. At the year end current assets exceeded current liabilities and provision for taxation by £499,342.

We have taken interests in certain companies through our association with the Anglo American Corporation of South Africa, Limited, and I would like to mention particularly our participation in the United Dominions Corporation (S.A.) Limited, a company formed to finance hire purchase and long term credit for the motor, engineering and allied trades. We have also obtained an interest in Western Areas Gold Mining Company Limited.

Through the year we increased our holding in South African Townships, Mining and Finance Corporation Limited to 4,460,091 shares. That corporation's net profit for the year ended September 30, 1959, rose by £95,709 to £462,744 mainly as a result of the increased income received from its investments in the Orange Free State gold field, and it was able to pay a dividend of 1s. 6d. per share, compared with 1s. for the previous year.

The profits of West Rand Investment Trust Limited showed a substantial rise of £921,263 for the year 1958 and the company declared a total dividend of 3s. 6d. per share compared with 3s. for the previous year. Increased production and profits have been made by the Vaal Reefs, Buffelsfontein and Hartebeestfontein gold mining companies during 1959. Zandpan Gold Mining Company Limited began full-scale shaft sinking this year.

While the scope of profitable mining activity in the older East Rand mines is diminishing, as is evidenced by the recent commencement of repayments of capital by Brakpan and Springs mines, this is in some measure being off-set by the extension of mining operations into new areas.

In January, 1959, Winkelhaak Mines Limited, the first new mine in the Kinross area, declared its maiden working profit. Later on in the year two new companies, Leslie Gold Mines Limited and Bracken Mines Limited, were formed to mine the area to the west of Winkelhaak and your corporation has acquired interests in both these mines.

Your company also intends following up its investment in The South African Land & Exploration Company Limited by subscribing for its proportion of the £2,000,000 of six per cent unsecured registered notes recently offered to shareholders of that company and Anglo American Corporation of South Africa, Limited. The proceeds of the note issue are to be used towards the financing of a new shaft system which is being sunk to facilitiate opening up and further exploration of the Withok area.

Diamonds and Copper

The corporation retains a considerable interest in the diamond industry through its holding in Anglo American Investment Trust Limited. A year ago it was predicted that 1959 would be a good year for the De Beers Group, and the successes of this last year have surpassed expectations. Gem sales reached £63,033,187 and industrial sales £28,102,756 making a total of £91,135,943 which far exceeds previous records.

The copper mines of the Anglo American Corporation Group have had a successful year. Rhodesian Anglo American Limited increased its net profits by more than £1,000,000 and paid a dividend of 5s. per share which is 1s. more than for the previous year.

Bancroft Mines Limited resumed operations at the beginning of April, 1959, and production at that mine is being steadily increased to the present target of 50,000 long tons of copper per year. Profits are satisfactory and, provided the copper price is maintained at a satisfactory level, payment of a maiden dividend may be possible in the not too distant future.

Our investment in the Rhodesian copper industry should show increasing returns over the next few years provided the political progress of the Federation continues unimpeded.

We have had a satisfactory year and we look forward to the future with confidence.

MINING FINANCE—*Continued*

HENDERSON'S-WITBANK : OPENING OF HOSTILITIES

It appears that the proposed takeover of Witbank Consolidated by Henderson's Transvaal Estates, which seemed to most observers to be both reasonable financially and logical technically, is to be the occasion for some unfortunate bickering between the companies concerned. The responsibility for this, it must be said, appears to lie wholly with the Witbank company.

The root of the trouble was an informal meeting of Witbank shareholders, at which some unpleasant things were said about Henderson's. In particular, it was stated that 66 per cent of Henderson's income came from Tweefontein Collieries, that this latter company was "in a bad way" and that its life was no more than three or four years. The implication, of course was that Henderson's stands to lose two thirds of its income in a few years.

Henderson's have brought up their big guns to deny this in a letter to Witbank shareholders. Henderson's now point out that on the basis of Tweefontein's present mining areas alone, the life is not likely to be less than Witbank's, while outside these limits there are probably a further 250,000,000 tons of coal. About 50,000,000 of these are on the Ogies property, the area which it is proposed to mine in conjunction with the Witbank property if the deal goes through.

Nigel Results.—An unchanged dividend of 6d. per share is recommended for the year to September 30, 1959 by Nigel Finance and Investment. The group profit after tax rose from £15,254 to £21,668. At the year-end, quoted investments were worth £445,627, an improvement of almost £90,000.

Konongo Dividend Cut.—A recommended final dividend of 3½d. per share from Konongo Gold Mines brings the total for the year to September last to 5d. per share, a reduction of 1d. from last year's level. In spite of a £23,000 reduction in the tax charge, the net profit subject to audit was £88,182, against £104,458 in 1957-8. Meeting, March 22.

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This feature appears every fourth week

Coming Events

The Hungarian Mining and Metallurgical Society are holding a Mining Congress in Budapest from September 12-18, 1960, in celebration of the Tenth Hungarian Mining Day. The object of the Congress is to ensure a broad exchange of views among coal mining, oil drilling, or, bauxite and mineral mining experts and to review the latest technical achievements. Papers may be read either in Hungarian, English, Russian or German. The Congress will be followed by excursions enabling visitors to study on the site, the lias hard coal mining in Southern Hungary, open cut and deep mining of lignite in Northern Hungary the Transdanubian manganese ore and bauxite mining, oil industry in the County of Zala, and mineral mining the mountains of Tokajhegyalja.

★

The sixteenth session of the United Nations Economic Commission for Asia and the Far East (ECAFE) is scheduled to open at Bangkok on March 9, for a two-week meeting. Several important decisions are expected from this meeting, which is to consider specific recommentations made by ECAFE's various committees and sub-committees.

★

The Institution of Mining Engineers has announced the following fixtures:

The Midland Institute of Mining Engineers: Lecture entitled "Methane drainage in the Barnsley seam of S. Yorkshire with particular reference to investigations at Maltby colliery" by E. White and A. Wright, at Royal Hotel, Sheffield. March 3, at 2.30 p.m.

The Mining Institute of Scotland: Lecture entitled "Human relations in the mining industry", by L. R. Milligan, at the Mining Laboratories, Edinburgh. March 16, at 5.15 p.m.

The Southern Counties Institute of Mining Engineers: Lecture entitled "A new geophysical method for the exploration of undersea coalfields" by A. C. Maries and W. C. Beckman, at the Institution, March 11, 3.30 p.m.

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Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 14s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 250s. 3½d.
Iridium, £23/£25 oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Manganese Metal (96%/98%) £245/£250
Magnesium, 2s. 2½d./2s. 3d. lb.
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Osmium, £21/£23 oz. nom.
Osmiridium, nom.
Palladium, Imported, £9
Platinum U.K. and Empire Refined £30 5s.
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	Nb_2O_5:Ta_2O_5	175s. per l. ton unit c.i.f.
Fluorspar—		
Acid Grade, Flotated Material		£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)		156s. 0d. ex. works
Lithium Ore—		
Petalite min. 3½% Li_2O		40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O		40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O		£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined		£28 0s./£30 0s. d/d
Magnesite Raw (ground)		£21 0s./£23 0s. d/d
Manganese Ore Indian—		
Europe (46%-48%) basis 6/8	s. 6d. freight	73d./75d. c.i.f. nom.
Manganese Ore (43%-45%)		69d./71d. c.i.f. nom.
Manganese Ore (38%-40%)		nom.
Molybdenite (85%) basis		8s. 11d. per lb. (f.o.b.)
Titanium Ore—		
Rutile 95/97% TiO_2 (prompt delivery)		£29 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2		£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)		156s. 0d./161s. 0d. per unit c.i.f
Vanadium—		
Fused oxide 95% V_2O_5		8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2		£16/£16 10s. ton c.i.f.

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TONS OF EXPERIENCE

For [illegible] years "BAXTER" have accumulated experience and "know-how" in the Quarry Industry. In addition our Design [illegible] and Production facilities have been extended.

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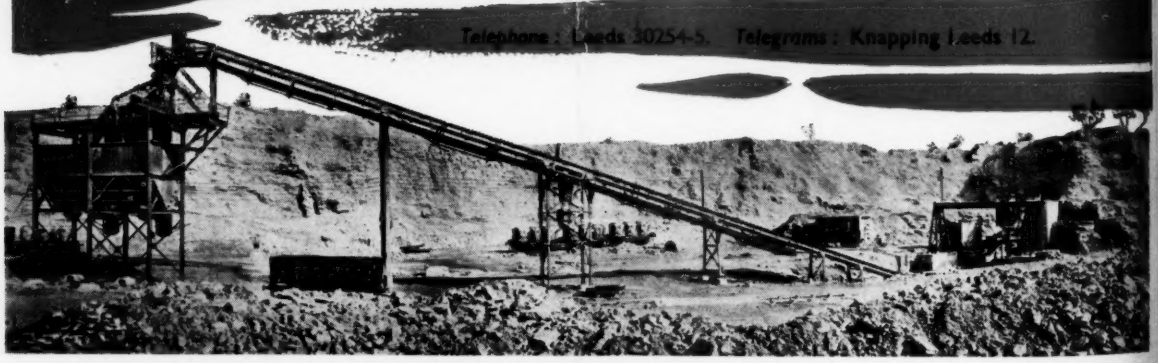

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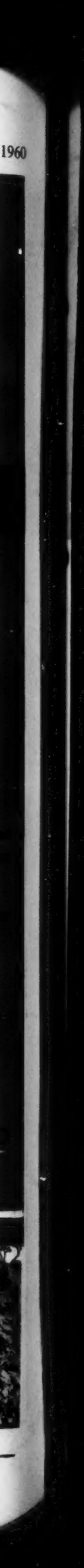
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